THE WORLD BOOK

THE BOOK

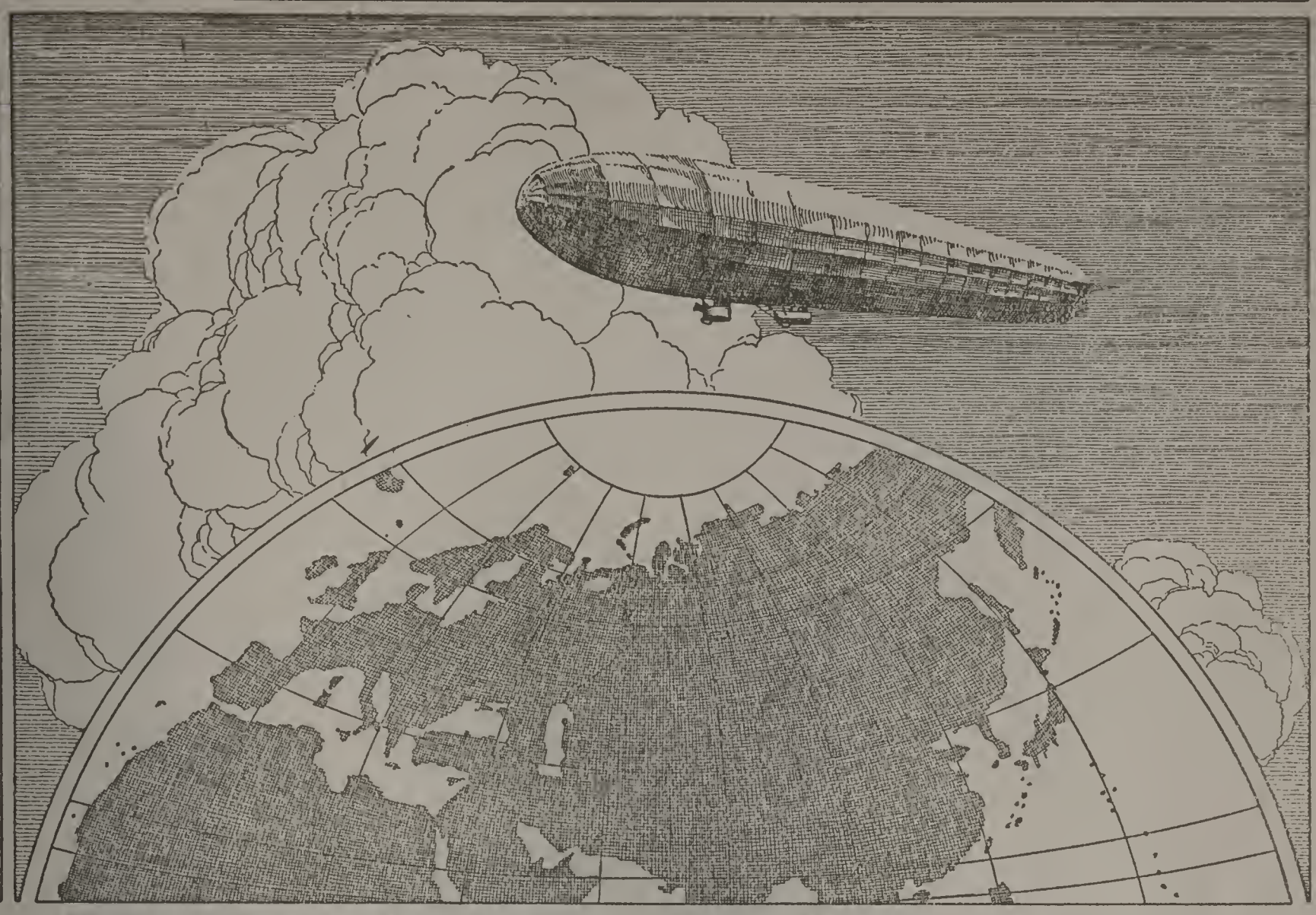
LIBRARY OF CONGRESS
1800

Class AE5

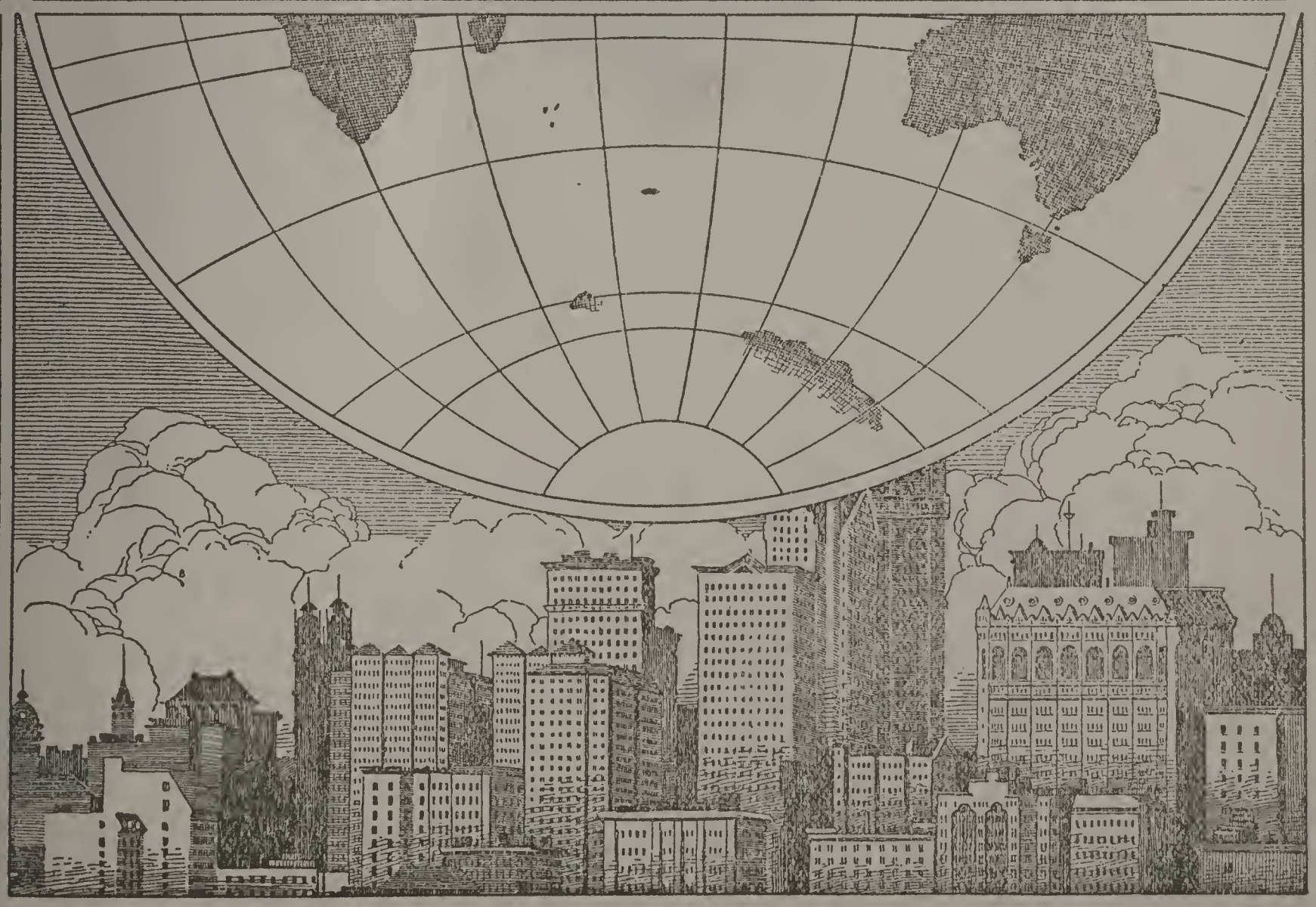
Book .W55

Copyright No. 1923

COPYRIGHT DEPOSIT.



THE WORLD BOOK



THE WORLD BOOK

ORGANIZED KNOWLEDGE IN STORY AND PICTURE

TRADE MARK REGISTERED

EDITOR-IN-CHIEF

M. V. O'SHEA

DEPARTMENT OF EDUCATION, UNIVERSITY OF WISCONSIN
MADISON, WISCONSIN

EDITOR FOR CANADA

GEORGE H. LOCKE

LIBRARIAN, TORONTO PUBLIC LIBRARY, TORONTO, ONTARIO

ASSISTED BY ONE HUNDRED FIFTY DISTINGUISHED SCIENTISTS, EDUCATORS, ARTISTS AND LEADERS OF THOUGHT IN THE UNITED STATES AND CANADA

In Ten Volumes *Volume Eight*

1923

W. F. QUARRIE & COMPANY

TORONTO CHICAGO NEW YORK

AE5
.W55
1923

THE WORLD BOOK

ORGANIZED KNOWLEDGE IN STORY AND PICTURE

FEB 15 '23

Copyright: 1917: 1918: 1919: 1921: 1922: 1923: W. F. Quarrie & Company

©Cl A696385

PETER'S PENCE, the name applied in the Roman Catholic Church to voluntary offerings for the support of the Pope. It is of medieval origin, said to have originated in England, from which it spread to the Continent. The Seventh Provincial Council (Baltimore, 1849) approved the collection of Peter's pence in the United States.

PETER THE HERMIT (about 1050-1115), a monk of Amiens, the famous preacher of the first of the Crusades, primarily responsible for one of the most gigantic religious movements the world ever saw (see illustration, page 1651). He was born in the diocese of Amiens, but little is known of his life from that time until 1095, when he began in his preaching to declare the necessity of a crusade to wrest the Holy Land from the infidel.

Convinced that it was his mission to inspire men to regain possession of Palestine, he rode about France on mule back, dressed in a monk's cloak of rough cloth and bearing in his hand a crucifix. In 1096 he set out toward Palestine with about 30,000 undisciplined followers, mostly from the poorer classes. They straggled on through Europe, but after crossing the Bosporus into Asia Minor proved so unruly that Peter left them and joined the army of Godfrey de Bouillon. He had a part in the capture of Jerusalem, and in July, 1099, preached on the Mount of Olives.

Consult Goodsell's *Peter the Hermit.*

PETITION, *pe tish' un,* a formal written request soliciting some right, grant or favor, made to a legislative body or to an official who has power to grant such request. Petitions were first presented to secure purely private ends, but such requests are now frequently presented to the courts to bring attention to special matters. In such cases it is a rule that an affidavit must also be made that the facts presented are true as far as known to the petitioner. The right of petition is one of the fundamental privileges of a free people, and is regarded by them as a national right. It lies within the discretion of the executive or legislative body to decide how such petitions shall be received, as no formal method has ever been provided for their reception.

PETITION OF RIGHT, a petition presented by the English Parliament in 1628 to Charles I, demanding that the king cease the practices of taxing the people without consent of Parliament, quartering soldiers in private houses, establishing martial law and imprisoning citizens without legal proceedings. Accustomed as all citizens of the United States and Canada are to-day to constitutional government, the great importance of this petition is not realized unless one calls to mind the long conflict between Charles I and Parliament, which ended with the execution of the king in 1649. Imbued with ideas of absolutism and the divine right of kings, Charles endeavored to make Parliament an instrument to accomplish his autocratic purposes. Had he succeeded, constitutional government, as now known, might not exist to-day. He dissolved one Parliament and adjourned another because of their refusal to vote supplies unless he would promise to consider their grievances and grant redress.

In the meantime, he attempted to impose his own will in government matters, commanded Parliament not to meddle in affairs of state, and asserted that parliaments existed only at the pleasure of the king. But the king needed money to conduct affairs, and the only way he could raise the necessary funds was to get the Commons to vote appropriations. Accordingly, Parliament met in adjourned session early in 1628. Again there was refusal to vote supplies until the king would promise redress of grievances. To make its position clear the Parliament drew up a petition to the king. It was a restatement of official and public rights, the same principles that had been set forth in Magna Charta, that had received the sanction of centuries of use and found expression in numerous acts of Parliament. The necessities of the king were so great that he ultimately accepted and signed the petition, but he had no intention of adhering to its provisions. This petition served to solidify sentiment in Eng-

land, gave the opposition a rallying point, and thus hastened the triumph of constitutional rule, which was absolutely established in 1689, when William III signed the Bill of Rights (which see).

PETRARCH, *pe'trahrk,* FRANCESCO (1304-1374), an Italian poet and classical scholar, born at Arezzo. His father was a political exile from Florence, and consequently the boy spent much of his childhood wandering from city to city. He was sent to Montpelier, Italy, in 1319, to study law, and four years later to Bologna for advanced study in the same subject, but his secret intention was to devote his life to literary work. His father opposed this love of writing and on one occasion burned all the son's books on poetry and the manuscripts which the young man had written. The father died in 1326, and Petrarch henceforth gave most of his time to literary pursuits.

PETRARCH

While at Avignon, Italy, in 1327, he saw the woman Laura, in whose honor he wrote nearly every poem for which he is now remembered. The rather unpoetic facts about her seem to be that she was Laura de Noves, wife of an Avignon citizen, that she was mother of eleven children, and that she died of the plague in 1348. Nevertheless she inspired the writing of some of the noblest lyrics in all literature and achieved for herself an immortal name. The poet seems never to have known her intimately, and his verses deal more with the ideal qualities of woman in general than with one in particular.

His Latin poems and prose had made him so famous by 1340 that both the University of Paris and the University of Rome offered him the laurel crown for poetry, and, choosing the honor from the latter institution, he was publicly crowned on Easter Sunday, 1341. He afterwards wandered over Italy, serving various important Church and State patrons, and in his investigations discovered several letters and two orations of Cicero. From time to time he went back to Avignon to be near Laura, and at one time bought a near-by estate at Vaucluse, with the same object. The news of her death caused him to write his *Triumphs,* among the most beautiful love poems in any language. After 1360 he spent his remaining years at Argua, near Padua, Italy, busy with his beloved books and manuscripts.

He prided himself on his Latin poetry, especially an epic, *Africa,* dealing with the adventures of Africanus; but these works are almost forgotten, while his Italian verses bid fair to outlast time. From that day in 1470 when his *Canzoniere,* or collection of songs, was published at Venice, his influence over the poets of Europe has been too great to be estimated adequately. He gave the sonnet a dignified position in poetry, with new vigor, warmth and nobility, while his refinement and art gave to Italian verse an importance it had never before enjoyed.

Consult Jerrold's *Francesco Petrarch, Poet and Humanist;* Calthrop's *Petrarch: His Life and Times.*

PET'REL, the name applied to a group of water birds, the smallest of those which make their home far out on the sea. They are swift fliers, and are often seen in the wake of ships. The name petrel, meaning *little peter,* refers

Up and down! Up and down!
From the base of the wave to the billow's crown;
And amidst the flashing and feathery foam
The Stormy Petrel finds a home—
A home, if such a place may be,
For her who lives on the wide, wide sea,
On the craggy ice, in the frozen air,
And only seeketh her rocky lair
To warm her young and to teach them spring
At once o'er the waves on their stormy wing!
—CORNWALL: *The Stormy Petrel.*

to their quick, graceful movements over the tops of the waves, suggesting the act of walking on the water. A distinguishing peculiarity of these birds is the tubular nostril. Petrels are found in both the northern and the southern hemispheres, but are most numerous in southern waters. Among the better known species are *Wilson's petrel, Leach's*

petrel and the *stormy petrel,* or *Mother Carey's chicken,* of which Kingsley's *Water Babies* has such interesting stories to tell.

Wilson's petrel, a bird seven inches in length, nests in the Antarctic regions, but wings its way into the northern hemisphere on the approach of winter. Its plumage is a mixture of sooty-black, gray and white; the feet and bill are black, and there are webs of yellow between the toes. The long wings of this petrel, which are sixteen inches in extent, and its long legs, make it seem larger than it is. Leach's petrel is very similar in size and coloring, but it has a forked tail, while that of Wilson's petrel is square. Leach's petrels breed chiefly on the islands in the Bay of Fundy, and are not found farther south than Virginia or California. The stormy petrel is a tiny bird not much more than five inches long, with a sooty-black coat relieved only by touches of white near the tail and on the wings. It bears the distinction of being the smallest web-footed bird known. It is a habitant of the Atlantic Ocean, and is rarely seen near shore.

The petrels are very interesting birds. They are fond of oily and fat foods, and flocks of them will follow a ship for many miles for particles of refuse. At night, wearied with the long journey, they nestle down upon the water and rest with the head under a wing. A single white egg is laid; the nests are usually made in holes or crevices of rocks, but sometimes a hole is burrowed in the ground near shore, and the egg placed at the end of the tunnel. The petrels, like the albatross, are regarded by sailors as birds of ill omen and as harbingers of stormy weather.

Consult Baird's *Water Birds of North America;* Godman's *A Monograph of the Petrels.*

PETRIE, *pe'tri,* WILLIAM MATTHEW FLINDERS (1853-), an English archaeologist who has made several remarkable discoveries in connection with Egyptian antiquities. His excavations in the Nile delta (1884-1886) brought to light the lost Greek city of Naucratis and the site of ancient Daphnae; in later investigations he recovered from the ruins of Kahun and Gurob a valuable collection of papyrus rolls. At Nagada he discovered the traces of a prehistoric people. Egyptologists value highly the published accounts of his investigations. Among his books are *The Pyramids and Temples of Gizeh, The History of Egypt, Royal Tombs of the First Dynasty, Tarkhan I* (1913) and *Tarkhan II* (1914). See EXCAVATIONS IN ANCIENT LANDS.

PETROGRAD, *pet'ro grahd,* the "City of Peter," until 1914 known as SAINT PETERSBURG, is the capital of Russia. It was founded by Peter the Great in 1703. In 1915 its population, including suburbs, was 2,318,645; of the city proper, 2,019,000. It was the fifth city in Europe and the eighth in the world. Few other cities had so rapid a growth. In 1700 the site was a dreary, marshy waste, inhabited by a few Finnish fishermen. It became the splendid capital of the czars and the center of Russian education and culture.

The empire was destroyed in 1917; a moderate provisional government was overturned, and the "red," destructive rule of the bolshevists succeeded it (see RUSSIA). The proud city was humbled; its population decreased over one-half, for the people fled from murder and starvation; the bolshevist rulers, fearful of capture, abandoned Petrograd and moved the government temporarily to Moscow, the ancient capital of the country. Whether a future orderly government will reinstate Petrograd as the capital city cannot be predicted.

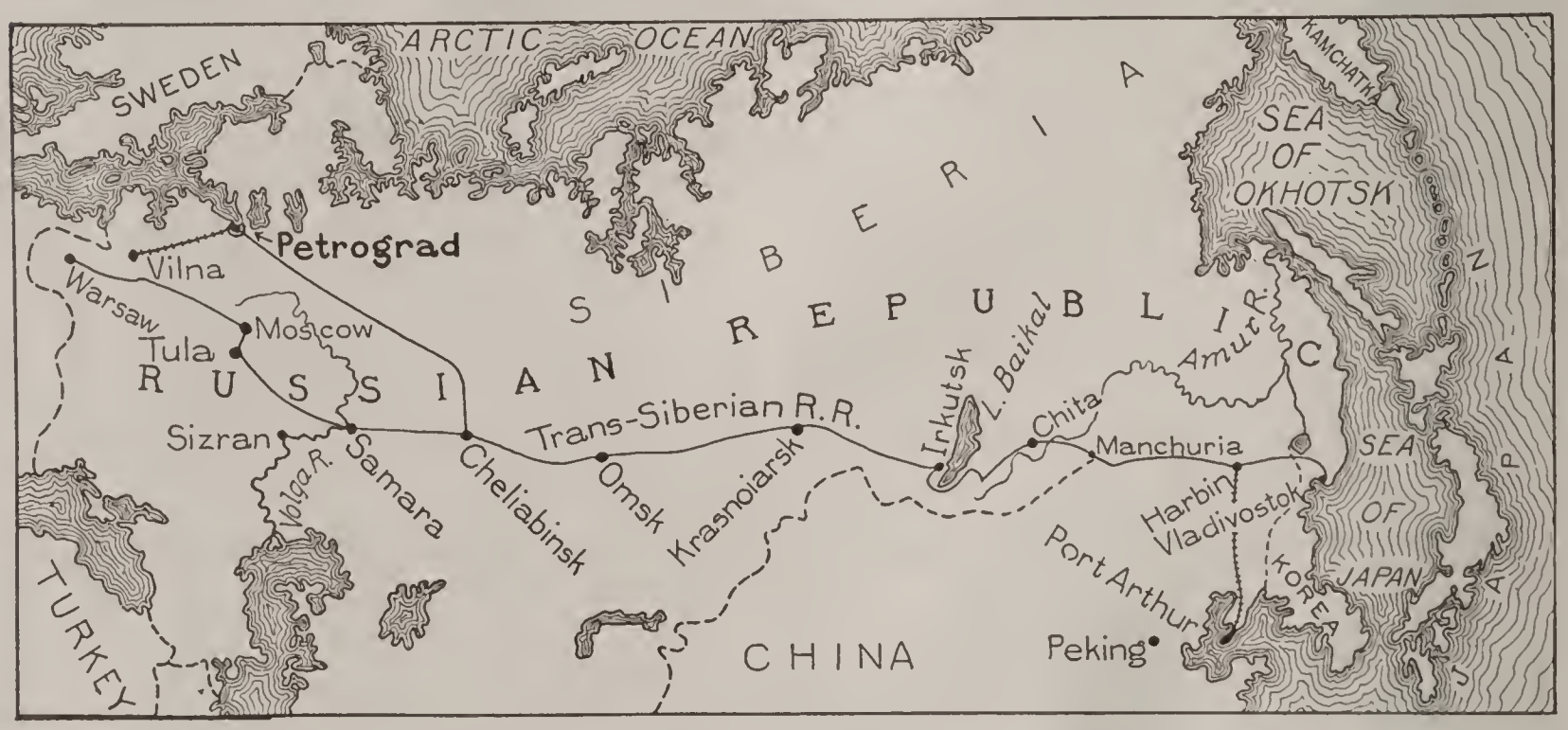
Location and Plan. Petrograd, which occupies the delta of the Neva River, is located at the eastern end of the Gulf of Finland, 400 miles northwest of Moscow. The principal part of the city lies on the left bank of the Neva River, the remainder occupying the several

islands formed by the branches of that waterway. The land is low, and formerly, in times of high water or in case of a strong west wind, the city suffered from floods, but this has been remedied by the construction of canals and a high, granite embankment along the river. The various parts of the city are connected by about 120 bridges, most of which span narrow canals. The Nicholas, the Troitsky and the Alexander bridges are the finest specimens of architecture in Petrograd.

The main part of the city is divided by three long avenues which radiate from the Admiralty, the center of the city. These are the Nevsky Prospekt, the Voznesensky Prospekt and the Gorokhovaya Ulitza. The Nevsky Prospekt is the principal thoroughfare of the city and one of the handsomest avenues in Europe. It is about 130 feet wide and four miles long. A part of the way it is lined with elegant shops, where the life of the capital is revealed in its most animated and picturesque aspect. Among the most important structures on the avenue are the Cathedral of Our Lady of Kazan, with its semicircular colonnade of Corinthian columns, the Duma (or City Hall), the Imperial Library, the Alexander Theater, the Anitchkov Palace, a monument to Catharine II and the Anitchkov bridge over the Fontanka, a waterway 150 feet wide.

Along the bank of the Great Neva, one of the arms of the Neva, extend palaces, costly private residences and the imposing Admiralty, surrounded by a beautiful garden. Here also are the Ministry of Marine building and the Marine Museum, which is nearly 1,600 feet long. The principal squares in this part of the city are Peter's, or the Senate Square, with the colossal equestrian statue of Peter the Great, and bordered by the buildings of the Senate and the Holy Synod; the Palace Square, in which stands the Alexander Column, a tall shaft of red granite surmounted by the figure of an angel; and the Field of Mars, a military parade ground.

Important Buildings. At the southwest corner of the Admiralty is the Cathedral of Saint Isaac, the most magnificent church in the city. It is built in the form of a Greek cross, and rising from the center is a great golden dome. The columns of its porticoes, of polished red granite, are over fifty feet high. Within the cathedral are massive columns of porphyry, malachite and lapis lazuli. The Cathedral of Our Lady of Kazan, an imitation of Saint Peter's, is notable for its richly-decorated interior. On an island in the Great Neva is the Cathedral of Saints Peter and Paul, containing the tombs of the Russian rulers.



PETROGRAD, AND ITS POSITION IN RUSSIA

Petrograd is noted for its palaces; of these, the Winter Palace, northeast of the Admiralty, is the most widely known. This is the largest and in many respects the most celebrated royal palace in the world, and was the residence of the czar until his abdication in March, 1917. It is the work of three empresses, Anna, Elizabeth and Catharine II, and contains a bewildering assemblage of apartments adorned with many paintings and sculptures of great value. When fully occupied the Winter Palace has accommodated 6,500 people. Adjoining the palace is the Hermitage, one of the leading art galleries of the world, containing a priceless collection of paintings and Greek and Roman

sculptures. Near by is the so-called Marble Palace, erected by Catharine II. South of the Summer Garden is the Russian Museum, in Italian style, one of the finest structures in the city. It is devoted to Russian art. Other important buildings are the Council of State building, the conservatory (seating 4,000), the Imperial Bank, the Taurida Palace, the Great Foundling Asylum and the theaters and hospitals.

On Vasilevsky Island, facing the Admiralty, are the Bourse, the University of Petrograd, the Academy of Sciences, the Academy of Arts, including a museum, and the Samenoff Gallery, rich in works of French and Dutch art. The fortress of Peter and Paul, now used as a state prison, is on a small island and stands beside the cathedral bearing the same name. Near by, on another small island, is the little wooden house in which Peter the Great lived when he began to build this capital city.

Education. Few cities are as highly favored with educational and scientific institutions and learned bodies. At the head of its educational system stands the University of Petrograd, with over 4,000 students in normal years. Other institutions worthy of mention are the Imperial School of Law, the Alexander Lyceum, the Medical School, with a faculty under military jurisdiction, the Technological Institute, the Mining Institute, the Institute of Civil Engineers, the Women's Medical Institute, the Institute for Higher Study for Women and the Imperial Academy of Arts.

Among the societies for the advancement of science are the Imperial Academy of Sciences, the Russian Geographical Society, the National Historical Society and societies for the study of anthropology, archaeology and astronomy. The Imperial Library has one of the largest collections in the world, exceeding 2,000,000 books and 124,000 manuscripts. The Academy of Sciences has a library of over 500,000 volumes, and that of the university has nearly as many. At Pulkova, ten miles southwest of the city, is one of the leading observatories of the world.

Industry and Commerce. Petrograd with its suburbs forms the second great industrial center of Russia, being exceeded only by Moscow. The chief manufactories include cotton and woolen mills, iron foundries, machine shops, paper mills, chemical works, tobacco factories and extensive manufactories of leather and glass. There are many small establishments engaged in the manufacture of food products, clothing, leather goods, hardware and other articles for common use. Printing and publishing is an extensive industry, and Petrograd is the chief seat of the Russian book trade.

Both foreign and domestic commerce are extensive. In 1885 a ship canal to Kronstadt was completed, making Petrograd a seaport, and practically giving it control of the greater part of the foreign trade of Russia. Railways and canals connect the city with all parts of the interior and bring to this northern seaport the products of a vast and fertile region. Petrograd is the financial center of Russia, and a leading money center of Europe. W.F.R.

Consult Stevens' *Petrograd, Past and Present;* Dobson's *Saint Petersburg.*

Research Questions on Petrograd

(An Outline suitable for Petrograd will be found with the article "City.")

What and where is the largest palace in the world?

How many people can be housed in this structure?

In what sense can it be said that Petrograd is a seaport?

What does the name of this city mean? What justice is there in calling it by this name?

What very important, dramatic event took place in the city in 1917?

How does the city compare in population with the capitals of the other great European nations?

Why did the people of Petrograd formerly fear a strong west wind. Why do they no longer fear it?

What church has this city which is modeled after the greatest church in the world?

In what did Peter the Great live while he was laying out his future capital?

How does the Imperial Library compare in number of volumes with the Bibliotheque Nationale? With the library of the British Museum? With the Library of Congress?

How many cities of Russia surpass Petrograd as an industrial center?

With what city of the western hemisphere does Petrograd compare as regards rapidity of growth?

What are called the finest specimens of architecture in Petrograd?

What is the principal thoroughfare of the city?

Who were responsible for the building of the greatest palace in the world?

PETROLEA, *pe tro' le a,* a town in Lambton County, Ontario, popularly known as "the oil town." Its name, in fact, is a variation of the word *petroleum,* which means, in Greek, *oil coming from a rock.* Petrolea is on the Grand Trunk and Michigan Central railways, and is

fifteen miles southeast of Sarnia, and about sixty miles from Saint Thomas and from Detroit. Bear Creek flows through the town. Petrolea is the center of the great oil-producing section of Ontario, and has numerous oil wells and refineries. A factory for making drilling tools is a natural supplement to the oil industry, and there are also a creamery, wagon works and canning factory. The creamery is said to be the largest in Ontario. Petrolea was founded in 1867, and was incorporated in 1874. Its waterworks and hydroelectric system are operated by the town. Victoria Park and Greenwood Driving Park, each covering ten acres, are interesting points. Noteworthy among the buildings are the hospital, a gift to the town from J. L. Engleheart, and Victoria Hall, erected in 1880 at a cost of $50,000. Population in 1911, 3,518; in 1921, 3,148.

PETROLEUM, *pe tro' le um.* When the Indians who inhabited what is now the western part of Pennsylvania first became known to white men, they were in the habit of collecting an oil which was found in springs and on the surface of creeks, and rubbing their bodies with it, claiming that the oil made them strong and enabled them to win races. Occasionally they burned small quantities in their religious ceremonies, for they held in the greatest awe this fluid which would burn, believing it to be associated in some way with an evil spirit. Later, white men, accepting the Indians' belief concerning the medical properties of this oil, bottled and sold it as a remedy for rheumatism. No one knew at that time that it was "liquid sunlight" of the past ages stored in the earth for man; no one suspected that it would in time be used to light houses and that its most valuable product would some day run gasoline motors.

A BURNING WELL

Illustration of a "gusher" on fire. Flames sometimes shoot upwards 300 feet, and often such a fire burns for a week before being extinguished.

Oil Wells. Petroleum is a mineral oil stored in sands, which are embedded between layers of rock through which the oil cannot pass. When wells are bored into this sand, the oil rises in the well. Sometimes the pressure is so great that the oil gushes out with such force as to throw it high in the air, and much oil has been lost from wells of this kind before the flow could be controlled by placing a cap on the pipe. Occasionally such a "gusher" gets afire and burns fiercely for days. From most

MAP OF OIL FIELDS

(*a*) Appalachian
(*b*) Lima-Indiana
(*c*) Illinois
(*d*) Northwest Louisiana
(*e*) Gulf
(*f*) North Texas
(*g*) Mid-Continent
(*h*) Colorado
(*i*) Montana and Wyoming
(*j*) California

wells, however, the oil has to be pumped. The depth of the wells varies from about 300 feet to over 4,500 feet. In general, the largest flow is obtained from the deep wells. When the flow stops, a charge of dynamite is lowered and exploded at the bottom. This usually removes any obstruction, such as an accumulation of paraffin, and also loosens the oil-bearing sand, whereupon the flow is resumed. The production of some wells has been greatly increased by this process of "torpedoing."

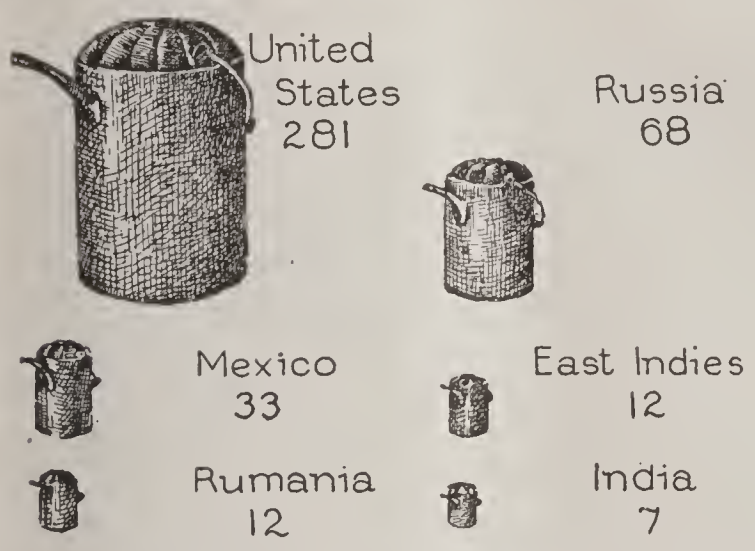
Refining. Oil as it comes from the wells is known as *crude petroleum;* it varies in color from a light brown to black, but most of it is a dark green; in thickness it varies from that of kerosene to that of thick molasses or hot tar. This crude oil can be used for fuel, for oiling roads and in making water gas, but it must be purified, or *refined,* for all other purposes.

Refining consists in distilling the crude oil, and then separating impurities from the products obtained by mixing a small quantity of sulphuric acid with them. As the oil is taken from the well it is stored in large tanks. From these it is placed in closed iron vessels which hold about 600 barrels, and is then heated. The vapor passes through coils of iron pipe that are surrounded by cold water. Crude petroleum is a very complex substance, and the various products obtained from it are separated from each other by increasing the temperature

BURNING OIL WELLS - STRUCK BY LIGHTNING

of the liquid in the retort as the distillation proceeds. At the lowest temperature naphtha and benzine are obtained, then gasoline, followed by kerosene. The last-named was once the most widely used and the most valuable product of the distillation, but gasoline is in such increasing demand that it has reached first place, and kerosene is accumulating in vast quantities, without an adequate market. But these products are not all, for from the remaining contents of the retort we obtain lubricating oil, vaseline and paraffin wax, and the solid matter still remaining is made into coke. Over 200 different commercial products are obtained from petroleum.

Transportation. The oil refineries are located at or near great centers of the industry. Oil is transported from the oil fields to these centers through lines of iron pipe, or "pipe lines," as they are called in the trade. More than 45,500 miles of these lines are in operation in the United States; could they be put together they would almost twice encircle the earth at the equator. From the refineries kerosene and gasoline are distributed to various parts of the country in tank cars, which are a common sight on all railways. Every city and town of importance has an oil station, consisting of several closed iron tanks filled with the different products, and from these the contents

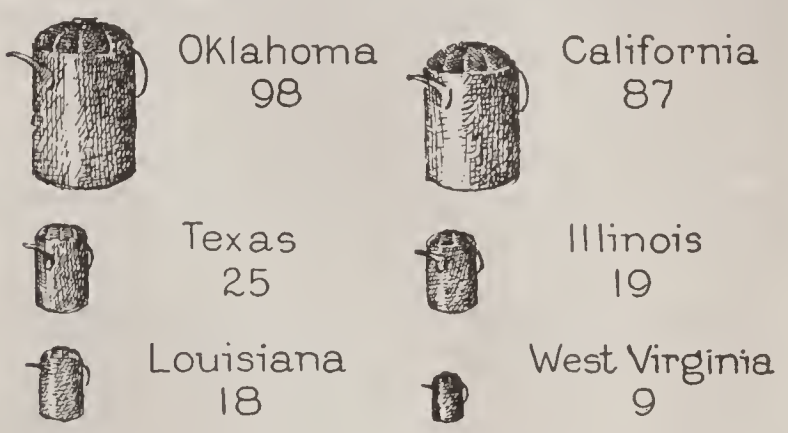


OIL PRODUCTION BY COUNTRIES

The figures given represent the average annual production for a period of five years.

are distributed to local dealers. Oil is shipped to foreign countries in tank steamers, constructed especially for the purpose.

Production. Petroleum is found in all parts of the world, but most of the world's supply is obtained from the province of Baku, around the Caspian Sea in Russia, and in the United States, which leads in the production. In 1921 the yield in the United States was 469,639,000 barrels; each barrel holds forty-two gallons. The five leading states, in the order of their oil production, are Oklahoma, California, Texas, Illinois and Louisiana. West Virginia, Pennsylvania, Ohio and Indiana were also important producers, but these fields have been worked so long that their supply is becoming exhausted; Pennsylvania for years led all states. The oil fields of Canada are located between lakes Erie and Ontario, in the province of On-



STATE PRODUCTION

The yield in each instance is the average annual production during a five-year period, ending in December, 1915.

tario. They produce about 230,000 barrels a year. The total production in the world in 1920 was 658,474,251 barrels. Of this, Mexico produced 159,800,000 barrels.

Uses. We are all familiar with the use of kerosene for illuminating purposes, of gasoline for furnishing power to motors and of benzine for cleaning; but there are many other uses of petroleum products with which we are not so well acquainted. In the Pacific states especially, crude petroleum is used for fuel in locomotives and in furnaces of steam boilers. It is also used in all sections for oiling roads to prevent dust. Lubricating oil obtained from petroleum has practically driven animal and vegetable oils out of the market for this purpose. Vaseline is extensively used as a toilet article and in medicine. Paraffin is used for candles, and most extensively in the manufacture of wax paper.

History. We have already seen that petroleum was known to the Indians. It was known to the ancients centuries before America was discovered. The slime and pitch mentioned in the Bible were forms of crude petroleum, and in those times it was used as a cement.

The first oil well in the United States was sunk by Col. E. L. Drake at Titusville, Pa., and oil was found August 28, 1859. This was the beginning of the petroleum industry in the United States. Drake's well yielded 2,000 barrels the first year and the oil was sold at $20 a barrel. Within a short time hundreds of wells

were sunk in the surrounding territory. From Pennsylvania the industry spread to West Virginia, Ohio and Indiana; the fields in Texas, California, Kansas, Oklahoma and Illinois have been of later development. Since the yield varies from year to year sometimes one field leads in production and sometimes another exceeds it. With extensive development the price has greatly decreased; it varies now from $3 to $5 per barrel, the quotation depending upon stress of competition and distance from the oil fields. W.F.R.

Consult Henry's *Baku, an Eventful History;* Paine and Stroud's *Oil Produetion Methods;* Thompson's *Petroleum Mining and Oil-Field Development.*

Related Subjects. The reader is referred to the following articles in these volumes :

Benzine	Naphtha
Gasoline	Paraffin
Kerosene	Vaseline

PETUNIA, *pe tu'ni a,* a flowering herb of the nightshade family which blooms from year to year, and is sure to be found in old-fashioned gardens. It is a native of Brazil, Argentine Republic and Mexico, but florists in America

PETUNIAS

have cultivated many hybrids, or mixed varieties. The leaves and stems of the plant are covered with long, white hairs, and the blossoms are pure white or varying shades of purple, violet, rose and pink. Petunias are grown in plots and borders in gardens, in window boxes and in conservatories. They thrive best in rich soil and when they have plenty of sunshine. The finest varieties are grow from cuttings, as plants propagated from seeds show a variation from the parent stock.

PE'WEE. See PHOEBE.

PEWTER, *pu'ter.* Our great grandmothers used plates, teapots and other utensils made of a grayish white metal that was easily polished and easily tarnished. The material of which these dishes were made was an alloy (which see) of tin and lead, or tin and lead with the addition of a small quantity of zinc, bismuth, antimony or copper, and was generally known as pewter. It is still used to some extent for beer mugs and a few other utensils, but pottery ware has practically driven pewter from the market. Pewter dishes of olden time, however, are highly prized by collectors. It was of such plates that Longfellow wrote in *Evangeline:*

> * * * the pewter plates on the dresser
> Caught and reflected the flame
> As shields of armies the sunshine.

PHAEDRA, *fe'dra,* in Grecian myth, a daughter of Minos and sister of Ariadne. Though he had abandoned Ariadne, Theseus, in his old age, proposed for the hand of Phaedra and was accepted; but when the young bride came to Athens, she fell in love, not with Theseus, but with his young son, Hippolytus. When he spurned her advances, she accused him to his father of insulting her. The old king prayed to Neptune to punish his ungrateful son, and Neptune answered his prayer very promptly, drowning, with his waves, the young prince, who was at that time driving his chariot by the seashore. Phaedra, in a fit of remorse, hanged herself. See ARIADNE; THESEUS.

PHAETHON, *fa'e thon,* in Greek mythology, the son of Apollo and Clymene. Clymene had refused to tell her son who his father was until the boy, shamed by his companions, made an imperious demand. When he learned that he was actually the child of the sun god, he boasted of it proudly, and was laughed at by his playmates. To prove his claim, he journeyed to the palace of the sun and asked of his father a sign of his sonship. Apollo promised to grant any request he might make, but when Phaethon demanded that he be allowed to drive the chariot of the sun for one day, the father tried to retract his promise. Phaethon persisted, however, and after cautioning him to drive slowly and to take care to go neither too high nor too low, Apollo reluctantly watched him depart. The rash boy used the whip on his fiery steeds, which tore up the heavens, dragging the chariot after them. They went so high that the earth beneath them almost perished with cold; then they rushed down so close to the earth that vegetation was scorched,

rivers were dried up and rocks were split. The poor Earth called on Jupiter for help, and he hurled his thunderbolts at the boy, who fell from the chariot and was killed.

The story of Phaethon is given on pages 4047-4049, in Volume V. See APOLLO. Consult Gayley's *Classic Myths in English Literature.*

PHALANX, *fa'langks,* the order of battle in which the ancient Greek infantry was formed. The legions of Rome afterwards adopted the same formation and proved invincible. The phalanx was sometimes a triangular-shaped wedge which was driven through the enemy's ranks; sometimes it was a solid square which resisted all attacks, but was not so mobile as the wedge. In a square it consisted of eight to sixteen ranks, the men being armed with spears from eight to fourteen feet in length and protected by shields which covered nearly the whole of their bodies.

PHANEROGAMOUS, PLANTS, or **PHANEROGAMS,** *fan er og' a mus, fan'er o gams,* are plants which bear flowers. The name is applied to the great division of the vegetable kingdom generally known as *flowering plants.* The distinguishing characteristics of phanerogamous plants are that they possess flowers with stamens, and ovules that develop into seeds with an embryo. See CRYPTOGAMS.

PHARAOH, *fa'ro,* or *fa'ra o,* the Biblical title of the kings of Egypt, ten of whom are

MERENPTHAH

Long believed to be the Pharaoh mentioned in *Exodus.* He is pictured playing draughts.

mentioned in the Old Testament. The Pharaohs of the times of Abraham and Joseph were probably of the Hyksos line, and, being themselves Semites and shepherds, were friendly to the wandering Hebrews. The Pharaoh of the Oppression, "the new King that knew not Joseph," was long identified with Rameses II, a builder of great cities, on which he employed Israelite labor (*Exodus* I), and the Pharaoh of the Exodus was supposed to have been Merenpthah, son of Rameses II. Recently discovered inscriptions, however, prove that these suppositions are incorrect. Among others mentioned are the Pharaoh who was the father-in-law of Solomon, the Pharaoh who was the opponent of Sennacherib at the time of Hezekiah, and Pharaoh Necho, who invaded Palestine and was overthrown by Nebuchadnezzar.

PHARISEES, *fair'i seez,* the strongest of the religious sects in Judea at the time of Christ. The Pharisees held themselves apart, not only from the heathen, but from the other Jews as well, and were commonly considered to have reached a state of piety to which ordinary men could not attain. To the written law of the Pentateuch they added the oral law, supposed to complete and explain the original statutes. It made rules for the minutest details of daily life, such as eating, drinking and washing of hands, and for tithing, fasting and Sabbath observance, till it put upon the whole people "burdens too grievous to be borne." Jesus accused the Pharisees of making the Word of no effect by their traditions, and spoke His severest words in denunciation of their hypocrisy (*Matthew* XXIII). Besides subscribing to the oral law, the Pharisees believed in the resurrection of the dead and an elaborate doctrine of angels and spirits. In all of these teachings they were bitterly opposed by their rival sect,. the Sadducees (which see).

After the Christian Church had organized itself independently of Judaism, the Pharisees withdrew themselves more than ever from the world. The Talmud, still recognized as authority by orthodox Jews of all nations, was the painstaking work of Pharisees during the early Christian centuries. There were numbered among the Pharisees many men of sincere piety and great learning. Saul and his teacher Gamaliel were of this sect.

Consult Fairweather's *The Background of the Gospels;* Herford's *Pharisaism: Its Aims and Its Methods.*

PHARMACIST, *fahr'ma sist.* See DRUGGIST.

PHARMACOPOEIA, *fahr ma ko pe'ya,* a book containing tables of drugs, a statement of their properties, action and use, the doses in which

they may be taken, and the standard of strength and purity. The volume is compiled usually under highest professional, sometimes governmental, authority, by men who have wide knowledge of the subject. The first book of the kind was the *Nuremberg Pharmacopoeia,* published in Germany in 1542. From time to time similar books were published, but they varied in accuracy and worth, and so the necessity of standardizing such publications became apparent. The governments of practically all civilized nations now authorize the preparation of national pharmacopoeias, which are continually revised. The first pharmacopoeia published in the United States appeared in 1778, but the earliest which was national in scope dates from 1820, the year of the assembling of the first convention of delegates of medical colleges and societies. Similar conventions have since been held every ten years, to provide for new editions of the work. In 1907, under the provisions of the Food and Drug Act, the pharmacopoeia of the United States was made a legal standard, and the ninth revised edition was published in 1915. Laws of Congress make provisions for the enforcement of the requirements of the work.

PHARMACY, *fahr'ma si,* the art of compounding and dispensing medicines and drugs. This subject is discussed in these volumes under the heading Druggist. See also Medicine and Drugs.

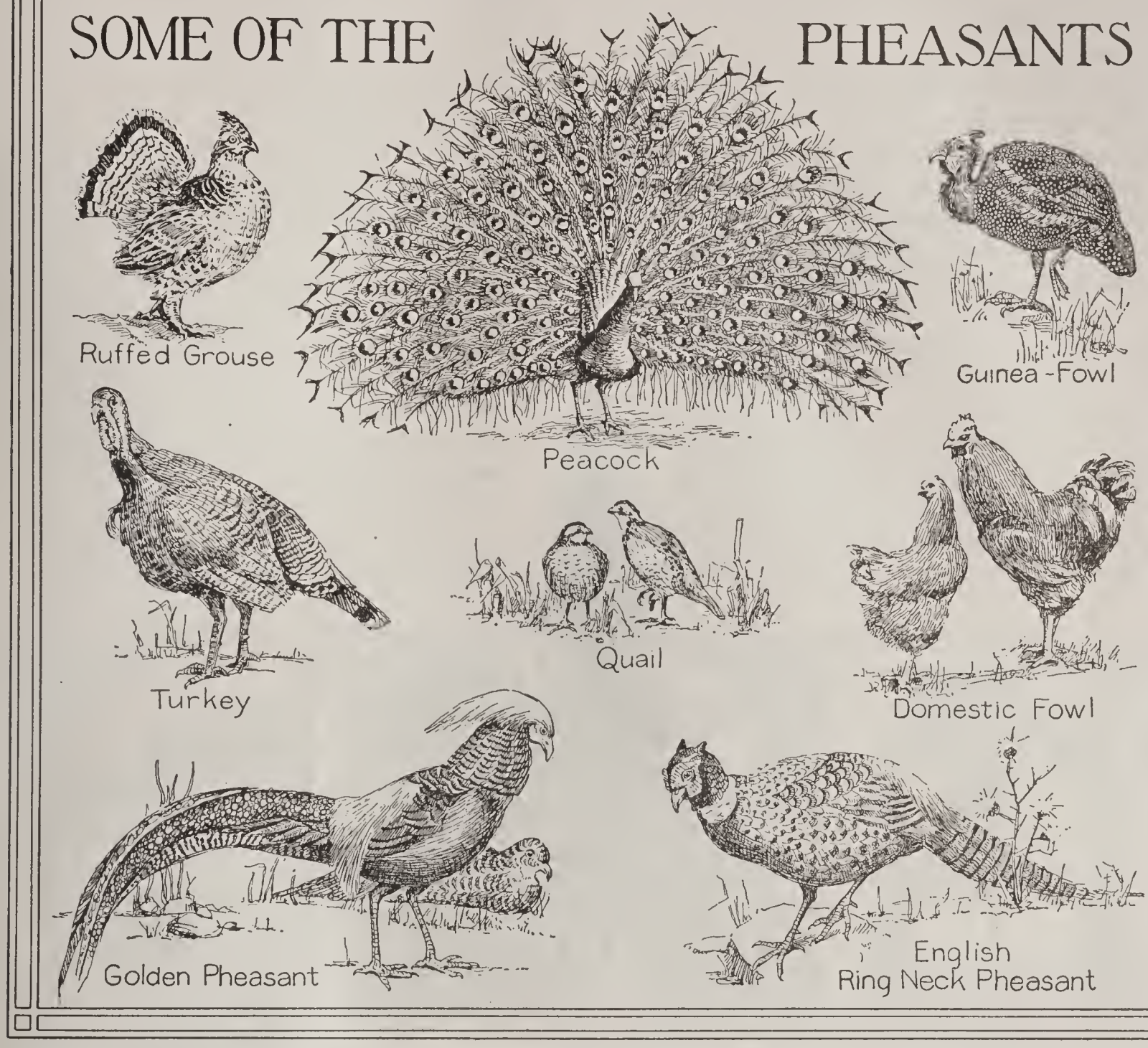
PHAROS, *fa'rohs,* a rocky island off the African coast, formerly celebrated as the site of a famous lighthouse, erected by Ptolemy I and long regarded as one of the Seven Wonders of the World. When the city of Alexandria was founded by Alexander, he caused the island to be connected with the mainland by a mole or causeway seven furlongs (280 rods) in length. The great lighthouse, resting on a base 100 feet square and of great height, stood for nearly 1,600 years; it was destroyed by an earthquake early in the fourteenth century. The peninsula is now occupied by part of the modern city of Alexandria, for many years an object of contention between France and England.

An illustration showing the relative location of Pharos and the mainland appears in the article Alexandria. See Seven Wonders of the World.

PHARYNX, *fahr'ingks,* a cone-shaped bag, about four and one-half inches in length, which leads from the cavity of the mouth to the oesophagus, or gullet. With the latter it is continuous at its narrower end. The pharynx consists of three layers; these are an outer coat of muscular tissue, a middle fibrous layer, and an inner mucous coat which is continuous with the mucous membrane of the mouth (see Membranes). Besides communicating with the mouth and gullet, it has openings which communicate with the nostrils, the larynx and the two Eustachian tubes (see Ear; Nose; Mouth; Larynx). In the process of swallowing, the muscles of the pharynx relax and contract to permit the passage of food from mouth to gullet. This organ also has an important part in the production of tone. See Palate.

PHEASANT, *fez'ant,* a group of brilliantly-colored birds belonging to the same family as the domestic fowl and the peacock. There are about 100 species of true pheasants, all of which are native to Asia. The word pheasant is derived from *Phasis,* the name of a river in Colchis, on the eastern shore of the Black Sea. In this region pheasants have always been found in large numbers. Two of the best-known species are the so-called *English* pheasant, brought to England supposedly by the Romans; and the *ring-necked.* These birds are natives of Asia Minor and of China, respectively. The English pheasant is bred in large numbers in English preserves as a game bird. The cocks of this species are most brilliantly colored, the head and neck being a bright green, the underparts bronze-red, and the flanks reddish-brown tipped with blue-black; the long, tapering tail is gray, marked with bands of black. In different lights, the plumage reflects varying shades of black, green, purple, and gold. Female birds are of a yellowish-brown color, with darker brown markings. The cocks are about three feet long, fully half of this length being taken up by the tail, and the females are about a foot shorter.

Ring-necked pheasants have as a distinctive marking a white ring about the neck, but their plumage shows a similar brilliant combination of red, purple, green and black. These two species have been crossed until pure-bred specimens have become rare, and both names are applied to the birds bred in the preserves. A naturalized American pheasant, established in several states, is a hybrid of these species. Pheasants nest on the ground, laying the twelve or more olive-buff eggs in a hollow among the leaves. Berries, seeds, worms and insects form their food. The propagation of these birds is encouraged by the United States Department of Agriculture because of their destruction of insect pests.



Among other well-known species are the *golden* pheasant, so called from its golden-yellow crest and bright yellow breast; the *Chinese silver* pheasant, a beautiful bird whose white upper parts are delicately marked with black lines; and the *eared* pheasant of Central and Eastern Asia, whose name refers to the long white tufts of feathers growing out from the ears. Representatives of these and many other species may usually be seen in American zoölogical gardens. M.R.T.

Consult Knowlton's *Birds of the World;* Tegetmeier's *Pheasants: Their Natural History and Practical Management.*

PHELPS, *felps,* ELIZABETH STUART. See WARD, ELIZABETH STUART PHELPS.

PHENACETIN, *fe nas' e tin,* a headache and fever remedy belonging to the coal tar group, in which are included antipyrene and acetanilid. All of these medicines have similar effects, but phenacetin is the least depressing of the three. It should never be taken, however, except on the advice of a physician. See HEADACHE; ACETANILID; ANTIPYRENE.

PHENIC, *fe' nik,* **ACID.** See CARBOLIC ACID.

PHI BETA KAPPA, *fi be' ta kap' a,* or *fe ba' tah kah' pah,* the oldest of the Greek letter college fraternities. It was founded December 5, 1776, at William and Mary College in Virginia, and before the beginning of the nineteenth century had established chapters at Yale, Harvard and Dartmouth. Its specific aims, together with its motto, were kept secret, but its general purpose was the promotion of scholarship and of patriotism. Gradually it lost its secret character, as well as its social side, and became what it is to-day—an honorary society, membership in which is conferred at graduation, or shortly before, upon those students who stand best in scholarship

THE EMBLEM

throughout their college course. To be chosen for a Phi Beta Kappa membership is a high scholastic honor.

Women as well as men may belong. In most colleges and universities annual meetings are held, at which speeches are delivered by prominent persons. The letters $\phi\ \beta\ K$ are the initials of the Greek words *Philosophia Biou Kubernetes* (Philosophy the Guide of Life), and the badge is a small gold watch key.

PHIDIAS, *fid'ias* (about 500-423 B. C.), the greatest sculptor of ancient Greece. Those relics of his art that have come down to us are among the noblest specimens of sculpture ever produced, unsurpassed in majesty, dignity and beauty. He was born in Attica and is said to have started his career as a painter. However, he soon turned his attention to sculpture and reached the highest development in his career under the patronage of Pericles, who commissioned him to execute many of the finest statues to be erected in Athens and to superintend the public works of the city. Among his colossal statues in ivory and gold were the celebrated *Zeus* at Olympia, the *Athena* of the Parthenon at Athens, and a statue of Aphrodite at Elis. His most famous bronze works were the *Athena* on the Acropolis at Athens, noted for its size, and the Lemnian *Athena*. Phidias, accused of impiety in having wrought his own likeness and that of Pericles on the shield of one of his goddesses, and of theft in appropriating some of the gold destined for her robes, was thrown into prison. There are conflicting stories as to how he met his death.

Consult Gardner's *Six Greek Sculptors;* Powers' *The Message of Greek Art.*

Liberty Bell | Independence Hall | Betsy Ross Flag

PHILADELPHIA, *fil a del' fi a,* the largest city of Pennsylvania, the third largest in the United States and the ninth in size in the world. It was founded in 1682 by William Penn and given its name, which means the *city of brotherly love,* by that gentle Quaker who applied in his colonial enterprise the principle of the Golden Rule. To this day Philadelphia is the *City of Brotherly Love.* In 1910 its population was 1,549,008; on January 1, 1920, it was 1,823,779.

The site chosen was at the junction of the Delaware and Schuylkill rivers, ninety miles from the Atlantic Ocean and half as far from the mouth of the Delaware, or the head of Delaware Bay. It was Penn's intention that the city should be built along the banks of both rivers and that growth should be back from each river, but for generations the Delaware site was preferred, and only within fifty years, or thereabouts, has the entire area between the streams been occupied. Philadelphia County extends for over twenty miles along the Delaware and for nearly as far the Schuylkill is its western border; its northern boundary is irregular. To-day, having reached Germantown, of Revolutionary fame, in its northwestern expansion, and a greater distance north and east, the city is coextensive with the county, although in the north there is considerable comparatively open country.

The area of Philadelphia is 129.6 square miles. It is ninety miles southwest of New York City, 136 miles from Washington and 825 miles from Chicago. Hourly train service connects it with New York. The city is almost exactly on the 40th parallel and is therefore directly east of Columbus, Indianapolis and Denver. It is served by three great railroad systems—the Pennsylvania, the Baltimore &

Ohio and the Reading. About a thousand trains enter and leave the city daily. Philadelphia is a seaport, although from its docks vessels steam a hundred miles before reaching the ocean. Twenty miles of water front present a busy aspect and indicate something of the magnitude of the foreign and domestic commerce that the city has built up.

In one respect Philadelphia presents a striking contrast to the two larger cities of the United States, New York and Chicago—a contrast which gives it one of its two popular names, the *City of Homes*. To a high degree New York and Chicago have developed the modern apartment building, in which from three to thirty or more families live; Philadelphia homes in 1916 averaged 5.4 persons per dwelling, and thirty-four per cent of its houses were owned by their occupants. The apartment house is gaining somewhat in popularity,

METROPOLITAN DISTRICT

Where the white cross appears, at the city's narrowest point between the two rivers, is the intersection of Market and Broad streets.

(1) Moreland
(2) Abington
(3) Cheltenham
(4) Springfield
(5) Upper Dublin
(6) Whitemarsh
(7) Plymouth
(8) Lower Merion
(9) Haverford
(10) Darby and Upper Darby
(11) Springfield
(12) Ridley
(13) Tinicum
(14) Center
(15) Gloucester City
(16) Camden City
(17) Haddon
(18) Rensauken
(19) Palmyra
(20) Chester
(21) Cinnaminsom
(22) Delran
(23) Bensalem

but the present "home" distinction will long cling to the city. Of about 350,000 buildings in the city, 315,000 are dwellings.

Streets and Buildings. Market Street is Philadelphia's principal thoroughfare. It extends directly westward from the Delaware, and is only a little below the center of the city, from north to south. On this street and almost exactly midway between the two rivers is the great city hall, flanked on the west by the Pennsylvania Railroad Station (Broad Street); two blocks to the east is the Reading Terminal. Both are on the north side of Market Street. Two blocks east of the Reading station and south of Market is the post office. Independence Square, the site of the historic Independence Hall, is three squares farther east and slightly south. Chestnut Street, an important business street, parallels Market, two blocks to the south.

The principal thoroughfare running north and south is Broad Street, which crosses Market Street at the city hall. On the north-and-south line from this center Washington Avenue is one mile south; Jackson Street, two miles; League Island Park (Hoyt Avenue), three miles; the four-mile line crosses League Island, where the two rivers meet and on which is the great League Island navy yard. North of Market on Broad it is one mile to Fairmount Avenue; to Berks Street, two miles; to Cambria Street, three miles; to Butler Street, four miles; to Loudon Street, five miles; to Grange Street, six miles, and to the northern limits of the city and county, seven and one-half miles. The two rivers are two miles apart along the Market Street line, and the city extends for about three miles farther to the west. Numbering of streets is begun at Market Street, extending north and south; thus, Broad Street north of Market is North Broad; south of it, South Broad. Streets which run east and west, parallel with Market, bear names; those which run north and south, excepting Broad and a very few others, bear numbers.

The city has about 1,625 miles of streets; 540 miles are paved with asphalt, and most of the remainder with wooden blocks or macadam. There are 1,900 miles of water mains and 1,400 miles of sewers.

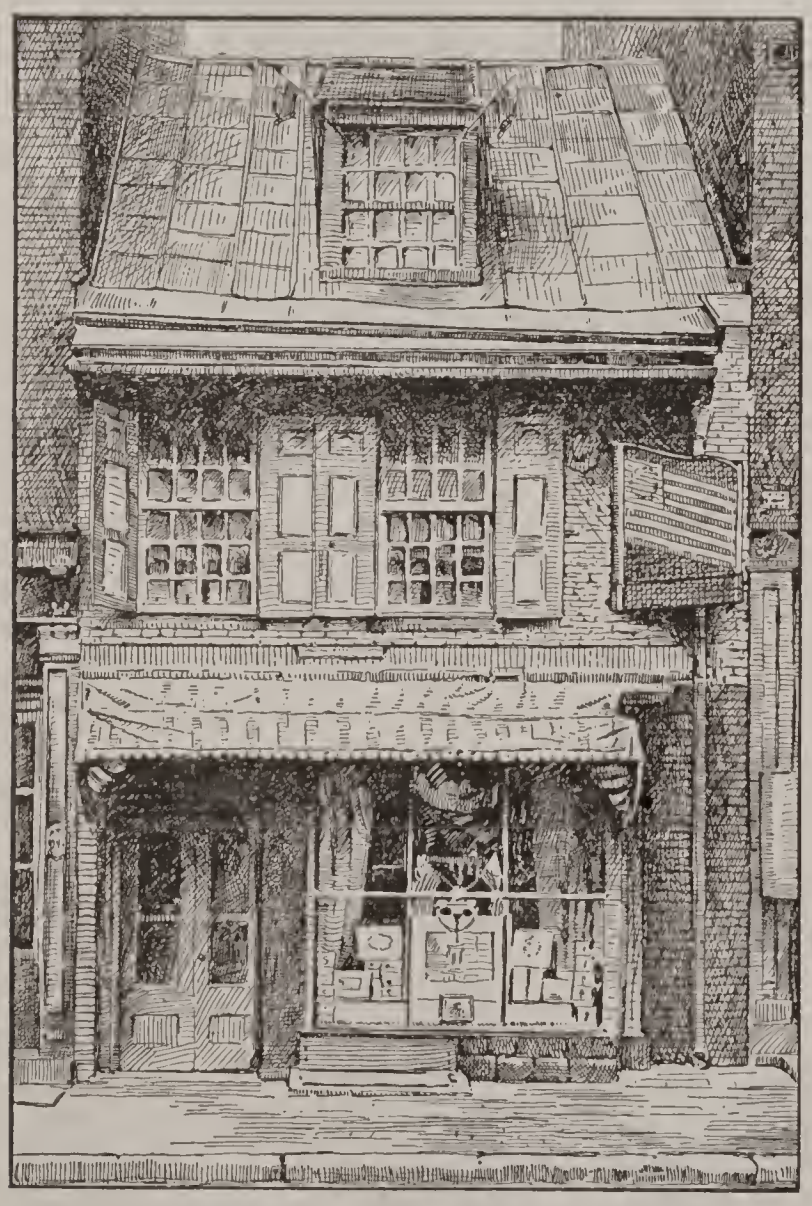
Historic Buildings. No other city except Boston contains so many buildings of sentimental interest to Americans. Much of the political life of the colonies centered in Philadelphia, and it was virtually the capital of the country during the Revolutionary period. The buildings which sheltered the Congress and in which many historic incidents occurred are reverentially preserved.

Independence Hall. The representatives of Pennsylvania colony in 1729 determined no longer to hold their legislative sessions in private houses, and they appropriated £2,000 ($10,000) for the erection of a building for the General Assembly. (The manuscript of the act providing the appro-

priation yet exists.) In 1734 the main building was completed, but it was without the bell tower until 1751. Plans were drawn also for a building at either end of the main building; those were finished in 1785, after the war had ended, and were used as a city hall and a courthouse. In 1828 an appropriation of $12,000 was made for a new steeple. The story of the Liberty Bell is given under that title, pages 3400-3401.

On May 10, 1775, in the east room, unimposing in appearance, yet the most historic spot in America, the patriots met who formed the Second Continental Congress. In the same room, on June 15, 1775, Washington was chosen commander-in-chief of the Continental army. Here, too, on July 4, 1776, the Declaration of Independence was signed. The American officers taken by the British in the battles of Brandywine and Germantown in September and October, 1777, were kept in this same east room, as prisoners of war. On July 9, 1778, the Articles of Confederation (which see) were signed here by representatives of eight states. The east room is shown in the halftone illustration herewith.

For more than a century Independence Hall was used for public meetings of all descriptions. To-day it is a museum laden with memories of the momentous days of the past. The Liberty Bell is in the main entrance; the Congress room, with desks of officers of the Continental Congress and fourteen of the original chairs of members, is



THE BETSY ROSS HOUSE

open to visitors; across the hall is another room of equal size, given exclusively to a display of relics of the Revolutionary period. The second floor, one long room, was for many years Philadelphia's public banquet hall. It is now a bare reminder of past glories.

The Betsy Ross House. At 229 Arch Street stands the home of Betsy Ross, with whose name is associated the designing of the first American flag. There are two rooms on the small ground floor. The first is now a salesroom of Ross memorials; the smaller rear room is bare, but is full of memories. Around the old fireplace in the corner, the story runs, George Washington and Robert Morris often sat with Mrs. Ross, planning the flag which should represent the new republic. There is more or less tradition connected with part of the story, but in the little room the visitor can imagine the courtly, patriotic group that centered in the home of the pleasant-voiced, kindly widow. The Betsy Ross flag is illustrated in the article FLAG, page 2195.

Penn Mansion. The home in which William Penn, the founder of Pennsylvania, lived with his family, was built in 1682. It was the first brick house erected in Philadelphia, and was on the street which later became Letitia Court, between Market and Chestnut streets, near the Delaware River. The encroachment of business houses threatened its destruction, so it was carefully taken down and brick by brick re-erected in Fairmount Park. The rooms contain Penn relics.

THE PENN MANSION

Congress Hall. Close to Independence Hall stands Congress Hall, now a museum of Revolutionary days. It was completed in 1790 on the former site of a wooden shelter provided for visiting Indians. From 1790 to 1800 it was the meeting place of the Congress of the new nation. In 1793 Washington was inaugurated here for his second Presidential term, with John Adams as Vice-President; four years later, in the same room, Adams and Jefferson took the oath of office as President and Vice-President. It was here that John Marshall, later Chief Justice of the United States, in announcing the death of Washington in 1799, uttered the phrase which was destined to be inseparably linked with Washington—"first in war, first in peace and first in the hearts of his countrymen."

CONGRESS HALL

After 1800 Congress sat in the new city of Washington and the hall became a court room.

Carpenter's Hall. Not far from Independence Hall, in a narrow court off Chestnut Street, between Third and Fourth streets, is another building famous in Revolutionary annals—Carpenter's Hall. This building was planned in 1724, but was not begun until 1770. The First Continental Congress met here September 5, 1774. Building operations were not completed at the time; the structure was finished in 1792. In 1787 the Constitution makers deliberated here for four months and completed that great charter for the

CARPENTER'S HALL

new nation. From 1791 to 1797 the Hall was the home of the first United States Bank. In point of fame Carpenter's Hall is perhaps second only to Independence Hall.

Other Old Buildings. Christ Church, on Second Street, near Market, was building from 1727 to 1744. Benjamin Franklin was one of the managers of a lottery in 1753 which was conducted to raise money for the steeple and for a bell. The old pulpit, put in place in 1770, is still in its original position. In the church graveyard at Fifth and Arch streets are the tombs of Benjamin Franklin and Robert Morris.

Old Swedes' Church was completed in 1700. It was the church home of the Swedish Lutherans, and for 130 years was served by pastors sent from Sweden. The present communion service has been used since 1773. The church is in the heart of the business district, as is Christ Church.

Saint Peter's Church also antedates the Revolutionary period, for it was completed in 1761, fourteen years before Paul Revere summoned the slumbering New England farmers to arms from Boston to Lexington. Commodore Decatur's grave is in the churchyard. The church is still used for services.

The famous United States Mint is illustrated in the article MINT.

A Great Manufacturing Center. Philadelphia follows New York and the Chicago industrial district in the number and importance of its manufacturing enterprises. Many producers have their factories at some distance from the city—some of them in New Jersey—but these are justly classed as Philadelphia enterprises. More than twenty-eight per cent of the value of manufactured goods for the entire state is credited to the city; about $7,000,000,000 represents the state's annual output; of this sum Philadelphia's factories supply almost $2,000,000,000 worth. Names known throughout the world contribute to the city's industrial fame; among these are Baldwin locomotives, Disston saws, Stetson hats and Cramp's ships. There are about 8,700 establishments, whose reports to the Census Bureau list very nearly 300,000 workmen.

Among the cities of the United States Philadelphia is preëminent in textile production, not only in the total value of all textiles, but in each of the four textile divisions—silk goods, hosiery and knit goods, woolens and worsteds, and cotton goods. One-third of the carpets and rugs made in the United States are produced in this city. The Baldwin Locomotive Works (see BALDWIN, MATTHIAS WILLIAM, page 549) are the largest makers of locomotives in the world.

In printing and publishing, the city enjoys the distinction of having a weekly literary magazine which sells more copies of every issue than does any other paper of any description in the world; it has an old-established farm journal with the world's largest circulation for publications of its class. Grandparents of to-day remember the Lippincott Publishing House since their youthful days; the company is yet counted among Philadelphia's assets. The Curtis Publishing Company is the largest publisher in America, excepting the William R. Hearst interests; it publishes *The Saturday Evening Post, The Ladies' Home Journal, The Country Gentleman* and *Public Ledger,* the last named a daily paper made great by George W. Childs a generation ago, and the *Evening Ledger,* established in 1916. Other great daily publications are the *Bulletin,* the *North American,* the *Record* and the *Inquirer.*

Manufacturing statistics do not include Federal government activities. There is a great navy yard at League Island, the Frankford Arsenal and a Quartermaster's Depot of the United States; these three employ over 3,650 wage earners. Their product is valued at over $8,000,000 per year in normal times, and in 1917 war demands for two years immensely increased this total.

Parks and Memorials. Philadelphia has 4,464 acres of parks, an area almost as great as is given to parks in Chicago, and nearly four times as great as New York's improved park acreage. Its citizens have never forgotten William Penn's desire to see Philadelphia made a "greene country towne." The most famous of its breathing places is Independence Square, back from whose center stands Independence Hall; the largest is Fairmount Park, along the beautiful Schuylkill River, where the Centennial Exposition (1876) was held. The river divides it into east and west sections, of 633 acres and 1,323 acres respectively. A square holding sentimental associations is Penn Treaty Square, where it is said the tree once stood under which Penn made his famous compact with the Indians—one of the few contracts with the red men that neither side ever broke.

League Island Park, at the extreme south end of the city, contains 300 acres, and this is the largest of seventy squares and small parks whose care devolves upon the city hall government; the other large and more important parks are governed by a park commission.

Of monuments the city has many that are more than locally famous. It is fitting that that of Benjamin Franklin (see page 2316) should stand in front of the city post office, for Franklin was not only Philadelphia's greatest citizen but the first Postmaster-General of the colonies. Equally appropriate is the Washington statue in Independence Square. Stephen Girard, the millionaire who founded Girard College (see page 2498), is remembered by a statue, as is also Muhlenberg, a Virginia preacher who delivered a Revolutionary sermon, then, while yet in his pulpit, threw off his cloak and stood before his congregation in full regimentals. The most imposing monument in the city is that of Washington, by a Berlin sculptor, which has stood since 1897 at the Green Street entrance of Fairmount Park. It was purchased by popular subscription and cost $200,000.

Educational Facilities. One of America's great universities, the University of Pennsylvania, is in Philadelphia. It was established in 1740 as a charitable secondary school; its growth is detailed in the article PENNSYLVANIA, UNIVERSITY OF. Bryn Mawr College, for women, is close to the city, and ranks among the best schools of its class (see page 967). The Drexel Institute, offering courses in art, sciences and industrial training, has an endowment of $2,000,000, the gift of A. J. Drexel. There are professional schools in law, dentistry, medicine and pharmacy; some of them are independent, and some are branches of the university. Other special schools are the Pennsylvania Academy of Fine Arts, special schools of the Roman Catholic, Episcopal and Lutheran churches and several strong schools of the Quakers (Society of Friends). The American Academy of Political and Social Science is widely known. Girard College has already been mentioned.

There are eleven public high schools, besides a Central High School for Boys. For the preparation of the teaching force of the public schools, numbering nearly 5,500, there is the Normal School, for women, and the School of Pedagogy, for men. The regular courses of instruction extend from the kindergarten to the doors of the university; manual training and domestic arts courses are also provided.

Churches, Theaters, Clubs, Hotels. Some of the oldest churches in America are in Philadelphia, and are yet in constant use. Three of these are mentioned above, under *Historic Buildings*. Modern structures in great numbers are the equal of those in any other city. A place of unusual interest is the old Friends' Meeting House, on Arch Street, not far from the Betsy Ross House. The Roman Catholic Cathedral is an imposing building; there is a large Jewish Synagogue, the Keneseth Israel, the equal of any in the country outside of New York City. All Protestant denominations own imposing places of worship.

There are over a score of important clubs. The Union League Club is famed throughout the country. Reminiscent of colonial days are the names of Franklin Inn, Poor Richard and Penn clubs. The "State in Schuylkill," founded in 1732, is the oldest club in America.

The Metropolitan Opera House, home of grand opera, seats 4,000 people; the Academy of Music seats 2,000, and there is nearly a score of other first-class playhouses. The Walnut Street Theater is the oldest in the United States, and still in service is the Musical Fund Hall, where Jenny Lind sang.

Philadelphia possesses several hotels which have acquired fame in two continents. The Ritz-Carlton is a member of the famous chain of Ritz hotels which have been founded in many of the world's great cities; the Bellevue-Stratford is probably as well known. Other leading hotels of high grade are the Walton, the Adelphia and the Saint James.

AN AMERICAN SHRINE.

Independence Hall, Philadelphia, and The Liberty Bell. The Bell is on view in the main entrance. The room at the right is the old Hall of Congress, shown on next page.

CONGRESS HALL.

The scene of great historic events; these are recorded on the tablet before the presiding officer's desk. The original desks and chairs are in the same position as in 1776.

RESEARCH QUESTIONS ON PHILADELPHIA

(An Outline suitable for Philadelphia will be found with the article "City.")

What little bare rear room in this city holds memories of some of the greatest men in the nation's history?

How many cities in the world are larger than Philadelphia? How many of these are in the United States?

How many are in Europe? How many in Asia? (See list with article CITY, on page 1393.)

What does the name of the city mean? How does the name express the principles and ideals of the founder?

How and when was the achievement of American independence celebrated in this city? Why was it fitting that this celebration should be held here, rather than in New York or in Washington?

How does the area of the city compare with that of the largest city in the country? With that of the second largest? Which of the three has the greatest average density of population?

What right has Philadelphia to its popular name of *City of Homes?*

Name three important documents that were adopted in this city, and tell what each stood for in the history of the country.

What is the most famous of the historic buildings of Philadelphia? When was it built? How much did it cost?

What is the bell which once swung in its tower called? Where is it now? What inscription does it bear?

How did it fulfil the mission indicated in its inscription more fully than its makers can ever have intended?

What is called the "most historic spot in America?"

Who made the first American flag? Describe the first flag made by her. (See article FLAG, Volume III.)

How does it happen that the home of the founder of Philadelphia no longer stands on its original site?

What notable events took place in Congress Hall?

Where was the phrase "first in war, first in peace and first in the hearts of his countrymen" first used? Who said it?

In what building was the Constitution of the United States drawn up?

What event in the history of Philadelphia shows that lotteries were not always looked upon as they are at present?

How large a proportion of the manufactured goods made in Pennsylvania is produced in Philadelphia?

What supremacy does the city have in the making of locomotives?

How does the park area of Philadelphia compare with that of Chicago? With that of New York City?

What is the most imposing monument in the city? How much did it cost, and how was the money raised?

Why can it be said that the founder of the city was not the pioneer white settler on the site?

To what sect did the majority of the early settlers of Philadelphia belong?

Who was Philadelphia's greatest citizen during pre-Revolutionary and Revolutionary times? Was he a native of the city?

City Government. Philadelphia possesses one of the finest municipal buildings in the United States. Its city hall covers four and a half acres, and is the home, not only of the city government, but of the county officers and city, state and county courts. Its tower reaches a height of 548 feet, less three-quarters of an inch; at its top is a statue of William Penn, thirty-seven feet long and weighing over twenty-six tons.

City and county governments cross each other at many points, for the city and county are coextensive. The mayor is elected for four years and may not be immediately reëlected. Authority is vested in him to a greater degree than in many other cities. He appoints the heads of more than a dozen departments, but the city treasurer, controller and city attorney are elected. The school system is not amenable to the city government authorities; the board of education, of fifteen members, acts under state authority. The law-making power is vested in a select council of one member from each of the forty-two wards and in a common council of one member elected by distinct groups of 4,000 voters each. Members of the first serve four years; of the second, two years—all without pay. The salary of the mayor is $12,000.

History. The first white settlement was not made by William Penn, for in 1636 a company of Swedes occupied the site, by authority of the Swedish queen, but they remained only a few years. In 1681 Penn sent Captain Markham as deputy-governor with a small company, and in July of the following year the "City of Brotherly Love" was laid out. That settlement was permanent, and in 1683 it was reënforced by a company of Germans, who settled, upon Penn's invitation, at Germantown, a few miles up the Schuylkill River, but now a part of the great city. Within three years after 1682 the settlement was in a thriving condition; there were 200 buildings and 2,400 people, largely Quakers, or Friends, with Germans second in numerical strength. The influence of these two groups strongly affected Pennsylvania history for generations, and the Friends yet have their American stronghold in this section. After the Revolution and continuing for many years the Scotch and Irish held the balance of power in the city, the effect of heavy immigration for over a decade.

Between 1682 and 1684 Penn was personally in charge of his colony. In the latter year he sailed for England, there endured a period of persecution, and when he returned in 1699 Philadelphia had grown to be a town of 4,500 people and of over 700 residences. Two years later (1701) he chartered the city; the Penn holdings of land were enormous, and the new city and Penn were soon disputing over taxation of his estates and various proprietary privileges which he enjoyed as Lord Proprietor of Pennsylvania, under his charter. This continued at intervals until Penn's influence was nullified by his financial ruin.

Next to Penn the man most conspicuous in the town's affairs was Benjamin Franklin, who entered the city in 1723 carrying a loaf of bread under each arm and eating a third. Within six years (1729) he was publishing the *Pennsylvania Gazette*, and from that time he was the dominant spirit of the city. His appeal in 1747 secured 10,000 volunteers for King George's War, and led to the erection of a battery on League Island. In 1755, under a militia law then passed, Franklin was made colonel of the Philadelphia regiment. From this time forward the city thought largely in militant terms, and naturally was foremost in resisting British injustice to the colonies. The spirit of opposition to England was but little tempered by a considerable number of loyalists and the Friends, the latter religiously opposed to strife.

The city was conspicuous during the Revolution by reason of the following historical events enacted within its borders:

October 17, 1773—Mass meeting protested against a tax on tea; its resolutions were afterwards adopted at a similar meeting in Boston.

September 5, 1774—First Continental Congress met in Carpenter's Hall.

May 10, 1775—Second Continental Congress met in what is now Independence Hall.

September 27, 1777 to June 18, 1778—British troops entered the city, and the expelled American army spent a terrible winter at Valley Forge.

October 4, 1777—Battle of Germantown was fought, and wounded Americans were laid in rows upstairs in Independence Hall.

May 14, 1787—Convention met in Carpenter's Hall to revise the Articles of Confederation, and on September 17 adopted the result of its labors, the Constitution of the United States.

During the entire period of the war, when the British were not threatening the city or in possession of it, Philadelphia was the seat of the Congress and therefore the center of the new nation's political activity. In describing the Philadelphia of that day, a historian says:

The city was then [1784] the greatest in the country. No other could boast of so many streets, so many houses, so many people, so much renown.

Philadelphia maintained its national political and financial supremacy until some time after 1830. From 1683 to 1799 it was the capital of Pennsylvania, and the capital of the United States from 1790 to 1800. New York forged ahead of its Pennsylvania rival as a money center about midway between 1830 and 1840. While engrossed in politics and finance all these years, it was at the same time notable for its literary achievements. The first newspaper in America outside of Boston, the *American Weekly Mercury,* was published in Philadelphia in 1719; it was the home of *The Pennsylvania Packet,* the first daily newspaper in America, which began its existence in 1784. Here also were published the first American editions of the Bible, in German (1743) and in English (1781).

Earlier than any other section of the country, Philadelphia raised its voice in opposition to slavery when, in 1688, the Germantown residents protested against the presence and extension of the slave traffic in the United States. The first abolition movement started in this city, by a convention in 1784; the American Anti-Slavery Society was formed here in 1833.

It was in 1854 that the territorial limits of the city were made coextensive with Philadelphia County; eleven villages were united with the city under one great municipal government. In 1876 there was held in the city the Centennial Exposition, commemorating the hundredth anniversary of American independence; it was acknowledged the greatest event of the kind up to that time in the history of the world (see CENTENNIAL EXPOSITION). Six years later (1882) the city celebrated the two hundredth anniversary of the founding of the city, and in 1908 a great pageant was held on the two hundred twenty-fifth anniversary. In 1887 another centennial, that of the signing of the Constitution of the United States, was celebrated. N.B.K.

Consult Pennel's *Our Philadelphia;* Powell's *Historic Towns of the Middle States;* Repplier's *Philadelphia: The Place and the People.*

PHILAE, *fi'le,* a small, uninhabited island in the River Nile, about five miles south of Assuan, just above the First Cataract. It is a granite rock 1,000 feet long and 500 feet broad, and on it stand some of the most interesting ruins to be seen in Egypt to-day. The building of the great dam on the Nile between Assuan and Philae has caused the submersion of the island and threatens the existence of the ruins, dating from about 570 B. C., which now have the appearance of a destroyed Venice. See ASSUAN.

PHILEMON, *fil'e mon.* See BAUCIS AND PHILEMON.

PHILIP, *fil'ip,* KING. See KING PHILIP.

PHILIP, THE APOSTLE, one of the twelve disciples of Jesus, a man of Bethsaida, where also Andrew and Peter lived. He is recorded as having brought Nathanael to Jesus, and their names are coupled together in the lists of the Twelve. From Jesus' gentle rebuke to Philip at the Last Supper (*John* XIV, 8-9), it is gathered that though he had earnestness and zeal, he lacked deep spiritual insight. Little is known of his later life or work.

PHILIP, THE EVANGELIST, one of the seven deacons appointed by the early Church in Jerusalem (*Acts* VI, 5). He took a liberal stand with regard to the interpretation of Jewish law and was the first to oppose the exclusiveness of the Jewish Christians. He preached in Samaria, baptized the Ethiopian eunuch, and was visited by Paul in Caesarea, on the latter's final journey to Jerusalem. Later traditions of his life are greatly confused with those of Philip, the Apostle.

PHILIP II (382-336 B. C.), king of Macedonia, the real founder of its greatness. He was the youngest son of Amyntas II, was born at Pella, and in his youth spent several years as a hostage at Thebes. While there he had the opportunity to learn from Epaminondas and Pelopidas, the two foremost Grecians of the day, much of military science and much about the political status of Greece. In 359 B. C., on the death of his brother Perdiccas, Philip was made regent for the infant heir, Amyntas, but he soon set aside his nephew's claims and made himself king. Various claimants to the throne encouraged disturbances within the kingdom, while it was threatened from without by the Illyrians, Athenians and other enemies; but the young king overthrew the pretenders, defeated the Illyrians, bought off the Athenians, and within two years was established on the throne.

Philip's Aims. His great ambition was to become master of all Greece; his career of aggression was commenced by attacking the Greek towns on his border. Amphipolis was captured in 357, Pydna and Potidaea in the next year, and he then took the Thracian town of Crenides, which he renamed Philippi, and which gave him control of the rich gold mines of Thrace. In 353 Methone submitted, and in 348, Olynthus, to which Athens had sent aid too late. Meanwhile he had advanced as far south

as Thermopylae, but found it too strongly guarded by the Athenians and turned back. In 346 the Thebans appealed to him for help against the Phocians, who had held the sacred city of Delphi for many years, and when he proved successful was given the place in the Amphictyonic Council which had previously belonged to Phocis. This was recognition of him as a Greek among Greeks.

Opposition of Demosthenes. At Athens Demosthenes perceived the plans of the Macedonian king, against whom he thundered forth his famous *Philippics,* but the Athenians were hard to rouse, and Philip's attentions during the years 345-339 seemed confined to Thrace, where he with great difficulty established his supremacy. In 338 B. C. he again entered Greece, this time at the request of the Amphictyonic Council, which desired his help against the Locrians. Now Demosthenes succeeded in stirring up Athens to a sense of danger and in persuading Thebes to join in a defensive league; but the allied armies were completely defeated by Philip at Chaeronea in August, 338, and Greek independence was at an end. With all Greece in his control, Philip began to plan an invasion of Persia, but in the summer of 336 he was assassinated by a Macedonian youth, probably at the instigation of Olympias, his divorced wife.

Estimate of His Career. Philip's fame has suffered because of the greater glory of his son, Alexander the Great, but he stands out as one of the truly noteworthy rulers of all times. His dream of a Greek empire in place of the little Greek states, with their jealousy and strife, was in advance of his age, and the means by which he secured it, both military and diplomatic, were masterly. He brought his army to a high state of efficiency and developed the famous "Macedonian phalanx," which did such effective work in the campaigns of his son. A.MC C.

Consult Hogarth's *Philip and Alexander of Macedon.*

Related Subjects. The reader is referred to the following articles in these volumes:

Alexander the Great — Macedonia
Demosthenes — Phalanx
Greece, subtitle *History*

PHILIP, the name of several French kings. Of these, Philip II, IV and V are of greatest interest and importance.

Philip II (1165-1223), known as PHILIP AUGUSTUS, was one of the greatest of the early French rulers. He was the son of Louis VII, who gave him a share in control in 1179. Philip became sole king in 1180. Contests with the great barons, some of whom had almost as much power as the king, marked the early years of his reign, and from most of them he succeeded in wresting concessions. By taking the part of the sons of Henry II of England in the risings against their father, Philip forced the English king to do him homage for his possessions in France; and when Richard I (the Lion-Hearted), Henry's son, came to the throne in 1189, the two monarchs caught the spirit of the Crusades and set out together for the Holy Land.

As they quarreled on their way to Palestine, Philip returned to France and intrigued with the Emperor Henry VI against Richard, who was arrested and imprisoned on his way home. Philip also formed an alliance with John, Richard's brother, and attacked Richard's possessions in Normandy. He met with small success, and Richard's death in 1199 ended the war. Almost immediately, however, war broke out with John, Richard's successor, and the English king lost most of his French estates. In 1214 Philip was called upon to face a powerful coalition composed of the Count of Boulogne, the Count of Flanders, the Emperor Otho IV and John of England, but at Bouvines he overwhelmingly defeated them, and effective opposition to his power was at an end.

Philip was to the full as great a statesman as he was a soldier. Reforms in administrations strengthened the hold of the central government on the people; the feudal system was modified so that the king was more obviously its head; and the Church was prevented from acquiring increased power. Philip was married three times—first to Isabella of Hainault, who died in 1190, then to Ingeborg of Denmark, whom he repudiated soon after his marriage, and last to Agnes of Meran. The Pope, however, refusing to sanction this last marriage, excommunicated him and forced him to take back Ingeborg.

Philip IV (1268-1314) was called THE FAIR, because he was, as one writer says, "the handsomest man in the world." He succeeded his father Philip III in 1285. The extent to which this king was responsible for the important events of his reign is a question, some authorities holding him to have been merely a figurehead, dependent on his ministers, while others represent him as a man of force, obstinate in the attainment of any purpose on which he had set his mind. The most noteworthy happening of his reign was his contest with the Pope.

France needed money, and new taxes were accordingly levied, some of which fell upon the clergy; but in 1296 Pope Boniface VIII issued a bull forbidding anyone to tax the clergy without Papal sanction. Philip retaliated by decreeing that no metals should be exported from France, and the Pope at once submitted, as this would have deprived him of a large sum yearly. In 1301, however, trouble broke out again, when Philip had the Papal legate in France arrested. Boniface at once issued another bull making most extravagant claims for the Papacy, and Philip, to make sure of the support of the people, summoned the first States-General. Philip's representative then seized the person of the Pope, who died immediately afterward; and after the brief reign of Benedict XI Philip made his own candidate Pope as Clement V. The Papal residence was transferred from Rome to Avignon, and thus began the seventy-year period of French control of the Papacy which is known as the "Babylonish captivity."

In order to obtain money for the increasing demands of the state, Philip persecuted the Jews, the Lollards and the Templars, finally inducing the Pope to suppress the latter order. He also debased the coinage of the realm. Early in his reign he came into conflict with Edward I of England, whose territory of Guienne he seized. He then turned against the Count of Flanders, who had assisted Edward, and allowed his agents to oppress the Flemish people cruelly. The result was a revolt in which Philip was decisively defeated at Courtrai and compelled to relinquish his claim on Flanders.

Philip VI (1293-1350), founder of the dynasty of Valois, was a nephew of Philip IV. He came to the throne in 1328 on the death of his cousin, Charles IV. This led to a contest with Edward III of England, who as a nephew of Charles IV insisted that his claims were superior. Since the defeat of Philip IV by the Flemish cities at Courtrai in 1302, the French nobles had been anxious for revenge, and in 1328 Philip led them to victory at Cassel. Relations with England grew constantly more unfriendly, and in 1337 the Hundred Years' War broke out. In 1340 the French fleet was defeated at Sluys, and six years later occurred the complete rout of the French in the Battle of Crécy.

The chief feature of Philip's internal government was its extravagance. He levied taxes to suit himself, despite the protests of the States-General, and he spent immense sums on tournaments and festivities. In the latter part of his reign France was swept by the terrible pestilence known as the Black Death. See FRANCE, subtitle *History*. A.MC C.

Consult Hutton's *Philip Augustus;* Castellieri's *Philip II August.*

Related Subjects. The reader is referred to the following articles in these volumes:

Crécy
Crusades
Hundred Years' War
Richard I

PHILIP, the name borne by several kings of Spain, two of whom were of special importance.

Philip II (1527-1598) was the only son of the Emperor Charles V and Isabella of Portugal. He succeeded to the throne of Spain in 1556. Owing to his early clerical education he grew up a cold, one-sided man, with no sympathy for those whose religious convictions differed from his own. His rule was characterized by one object, namely, to stamp out opposition to the Roman Catholic faith. He first married Maria of Portugal; after her death Mary, queen of England, became his wife. The English, however, refused to acknowledge him as king or to help him in the war he had provoked with France, though Queen Mary sent him supplies and troops. A peace satisfactory to Spain was finally concluded.

The reign of Philip II marks the beginning of the gradual downfall of Spain and the loss of Spanish power at sea. The Netherlands, one of the most valuable possessions of Philip, revolted, and after a struggle lasting nearly thirty years, costing Spain an enormous sum in money and men, threw off the yoke of Spain. The British destroyed the mighty Armada he sent against them in 1588, and the power of Spain as a maritime nation was shattered. Philip was more successful against the Turks; Portugal was conquered, but the commerce of Spain had suffered so terribly that the country never recovered. The Spanish possessions in Mexico and South America were harassed and plundered by British ships, and many vessels in the ports of Spain itself were captured. Mary of England, his wife, died in 1558, and he married Elizabeth, daughter of Henry II of France; on her death he entered into a fourth marriage with Anna, daughter of Emperor Maximilian II.

During Philip's reign the Inquisition was at its height, and the king thought that in supporting its harsh measures he was really working for the ultimate benefit of mankind. He has been accused of helping in the instigation of the Massacre of Saint Bartholomew, and his proposed conquest and conversion of England

appealed to him as a glorious deed for the benefit of Roman Catholicism.

Philip V (1683-1746) was the first of the Spanish Bourbon dynasty. He was the son of the Dauphin Louis and Maria Anna of Bavaria, and grandson of Louis XIV and Maria Theresa, sister of Charles II of Spain. Charles II left the crown of Spain to Philip by will, and the latter was proclaimed king in 1700. This led to the War of the Spanish Succession, with France and Spain allied against England, Holland, Austria, Prussia, Denmark, Hanover, Portugal and Savoy. In 1713, by the Treaty of Utrecht, Philip was recognized as king, but Spain had to give up Gibraltar, Minorca, Sicily, the Netherlands and Naples.

Philip married, first, Marie Louise of Savoy, who died in 1714. His second wife, Elizabeth Farnese of Parma, was an ambitious, scheming woman, who caused trouble throughout Philip's reign. Philip was a weakling with few virtues. In 1724 he resigned in favor of his son Louis, but when Louis died he resumed the crown, in spite of his incapacity. His son Don Carlos succeeded in capturing the Two Sicilies from Austria, and in 1741 Spain allied itself with France against Maria Theresa in the Austrian War of Succession. His wife's schemes and ambitions, combined with the plans of her favorite, Alberoni, dragged Philip into entanglements he had neither the wit to avoid nor the ability properly to master. He died at Madrid and was succeeded by his second son, Ferdinand VI.

Consult Hume's *Spain: Its Greatness and Decay.*

Related Subjects. The reader is referred to the following articles in these volumes:

Armada
Charles (page 1277)
Mary (England)
Netherlands, subtitle *History*
Spain, subtitle *History*

PHILIPPINE, *fil'i pin,* or *fil'i peen,* ISLANDS. Just half way round the world from the possessions of the United States in the West Indies lie its 7,083 islands of the Philippine group, only 2,441 of which are named. Unique by nature, they have also a unique story. The latest chapter is the most novel—the spectacle of a primitive race not merely well governed but taught to govern itself, at the hands of a stay-at-home nation from the opposite side of the world, without previous experience in overseas rule.

Location and Area. Except for Samoa, the Philippines are the southernmost territory under the American flag, for they approach to within five degrees of the equator and extend but little farther north than the latitude of Porto Rico. From the most northern inlet of the group the mountains of Japanese Formosa may be seen on a clear day; from the most southern a long-range cannon might almost drop a shell on British North Borneo, and from Mindanao, the largest southern island, a steamer could reach Dutch islands in a few hours. But the mainland of Asia is several hundred miles away across the China Sea—the French country of Indo-China directly west and Canton and Hong-kong northwest.

There is said to be a legend among some of the Philippine tribes that their land was formed when a giant threw into the sea a huge mass of rock, which broke into many pieces. Were all the 3,141 known islands and those which have been overlooked laid side by side in the giant's hands they would occupy a little more land than Arizona, which is the fifth in size of the American states, and nearly half as much as any of the prairie provinces of Canada. But if Luzon and Mindanao, which are the size of Kentucky and Indiana, were omitted, together with nine islands next

LOCATION MAP

The Philippine Islands are represented by the slender, solid black areas southeast of the continent of Asia. They are almost directly south of Japan.

in importance, the 3,130 others would not fill any state other than Rhode Island, Connecticut or Delaware, for they contain on the average only two and a half square miles. It is not surprising, then, that nearly half of them have never been named, nor that two-thirds of them contain no people. The total area of the archipelago is 115,026 square miles.

Filipinos and Other Races. Anyone who referred to the Indians of America as Americans would cause little more confusion than most of us do with our idea of the word *Filipino*. A score of years after Magellan's visit to the islands a Spanish admiral gave the name *Islas Filipinas* to part of the group, in honor of the prince who later became Philip II. In time the name was bestowed upon all of them, and the natives whom the Spaniards met were called *Filipinos*. But not all the inhabitants came under Spanish influence; to-day those who escaped it are not included in the term.

The Filipinos are Malays, who came to the land not long before the Europeans, driving into the mountains other Malays who had preceded them. The very first invaders had found a race of curly-haired people less than five feet in height, remnants of the lowest stage of humanity. These the Spaniards called *Negritos* (little blacks). About 25,000 of them remain, forming nearly as large a proportion of the population as the Indians do in the United States. The Malays who fled before the Filipinos are thought by many to be now superior to them. As mountain dwellers they have lived in a more invigorating climate and have had to work for their living, while the Filipinos loitered in the rich tropic lands of the coast. The Igorots (also spelled *Igorrotes*) cover mountain sides with terraces, said to be the most remarkable in the world, on which they raise rice and other crops by irrigation. Most of them were head-hunters, but in many instances the liking for this sport has been replaced by a passion for baseball, tugs of war or foot races. Still other Malays came after the Filipinos, and might have conquered them but for the arrival of the Europeans. They are Mohammedans, and so were called *Moros,* or Moors, by the Spaniards, who had driven the true Moors out of Spain but a half century before.

No one knows just how many people there are in the Philippines, for some of the tribes are still out of touch with the government. But estimates and census figures combined place the number at 10,350,730 (1918), of whom perhaps 1,000,000 are non-Christian. The Filipinos are largely Roman Catholics. Many of them, among whom may be included perhaps all the leaders, are *mestizos,* or mixed bloods, and count among their ancestors Spaniards, Chinese and, in some cases, Mexicans.

The most picturesque of the natives are the wild tribes. In their natural state most of them wear only a breech cloth, but others are fond of bright-colored cotton fabrics of extravagant pattern. The Moros dress in pajamalike suits,

OUTLINE MAP

The largest islands and chief cities of the group are named on the map, and surrounding waters are identified.

with gaudy sashes and turbans. The Filipinos have adopted the white coat and trousers common to white men of the tropics, but when the other tribes begin to imitate them the latter commence with hats, then adopt shirts and coats, and few of them have reached the stage of trousers or shoes. Even the efficient and well-disciplined Igorot and Ifugao constabulary, or military police (a group of whom is shown in the panel which heads this article), have no uniform below the waist but the "G" string and their shiny brown skins, and the well-organized police of other tribes indicate their office by pinning their "stars" to their loin cloths.

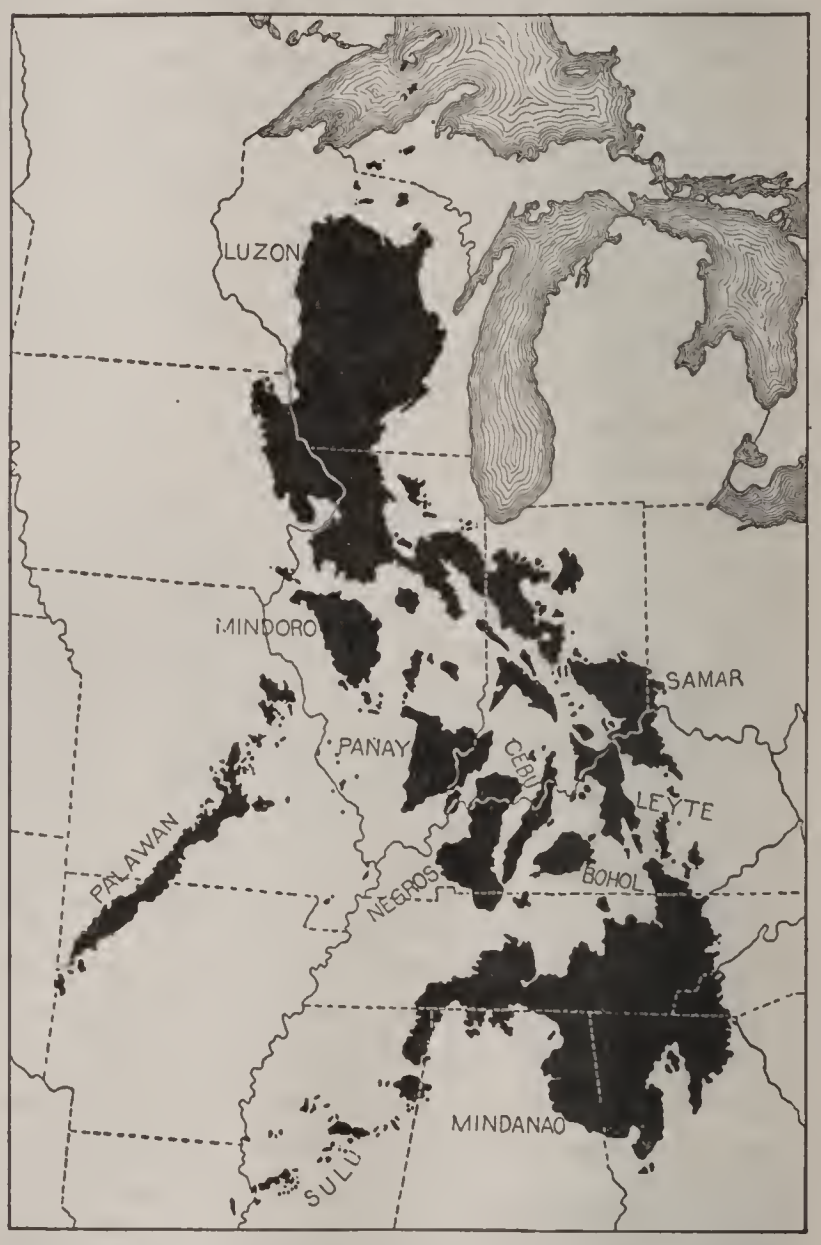
Aside from their Christianity and their dress, there is now little to distinguish the Filipinos from the other Malays. Only a small number

of them were educated in Spanish days, and their morals were decidedly inferior to those of their mountain brothers. Few of them understood Spanish or any one of the numerous Filipino dialects but their own. Work they consider degrading. Their houses, though never built in the trees or on stilts like those of the wildest tribes, were generally neat and well made bamboo and grass huts, but they were not so solidly put together as those of the mountain men.

What the Islands Are Like. The Philippines are mountain ranges rising out of the sea, and the islands are connected with each other and with the other East Indies by submerged mountains. Part of the land is volcanic in origin, and there are a dozen active volcanoes, one of which is Mount Apo in Mindanao, whose crest is over 10,000 feet high. The general trend of the mountain range is from north to south, but there are innumerable rugged spurs which cut the larger islands into many isolated sections. Coral reefs fringe the shores, of which there are altogether more than twice as many miles as on all the coasts of the United States. In the largest islands there are a few rivers, but they have rapid descents, and except near the sea are navigable only by rafts.

Away from the mountain sides, where pines are frequent, the vegetation of the Philippines is typical of the tropics. Bamboos and banyans, bananas and cocoanuts, palms, mangroves, tree ferns, india rubber and gutta-percha and a thousand other valuable trees cover much of the land. Of several hundred fiber plants the best known is a sort of banana called *abaca,* from which comes the famous manila hemp, for ropes, binder twine, cloth and manila paper. Over half of the country bears a wild grass about three feet high. Lumber forests occupy 40,000 square miles, and there are 200,000 million board feet of valuable timber awaiting the sawyer, more than in any state of the United States except Washington, Oregon or California, and one-fourth as much as in all Canada.

In spite of the belief that they were once connected, the different islands do not have the same animals. Palawan, the long, narrow island in the southwest, and its neighbors have zoölogical types familiar in Borneo but unknown in the other Philippines. It is not always possible to tell which of the wild animals are native and which have descended from domesticated specimens brought by man. There are, for instance, herds of wild water buffalo or carabao (whose tame relatives are the work horses of the Filipinos) and wild hogs and deer. There are very few of the highest type of animal—the mammals, or breast feeders. A wild cat, squirrels, many bats, a lemur and a monkey are found, and several peculiar genera known nowhere else in the world. There are beautifully-colored birds of many sorts, among them parrots typical of the tropics, huge monkey-catching eagles from the mountains, and orioles, larks, swallows and other forms familiar in



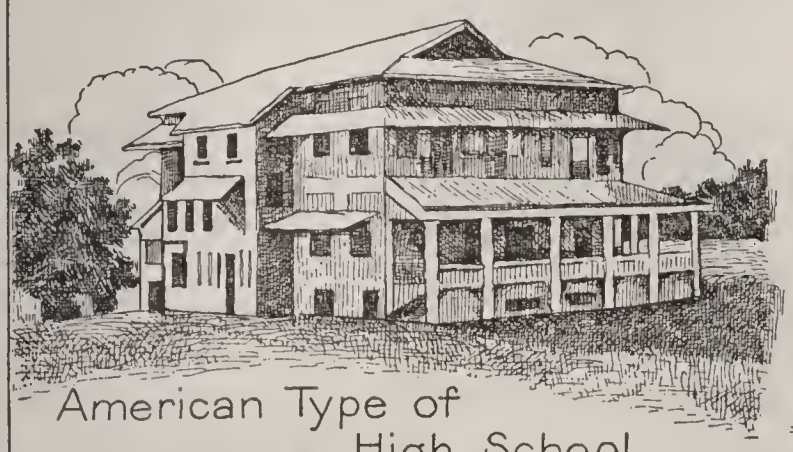
COMPARATIVE AREAS AND DISTANCES

Overlaid on the United States the Philippine Islands would extend from Northern Wisconsin to nearly the central part of Georgia; from east to west the greatest width equals the distance from eastern Tennessee to the western boundary of Arkansas.

America. Snakes large and small, flying lizards, iguanas and crocodiles sometimes eighteen feet long are the most common reptiles.

Spanish Days. It was on the first voyage round the world, in the spring of 1521, that Magellan discovered Mindanao, Cebu, Bohol and smaller islands, and fell while aiding one native chieftain in a little intertribal battle. Though by a treaty made eight years later Spain relinquished all this part of the world to Portugal, Spaniards from Mexico made a permanent settlement at Cebu in 1565, and founded Manila, their capital, in 1571. Near

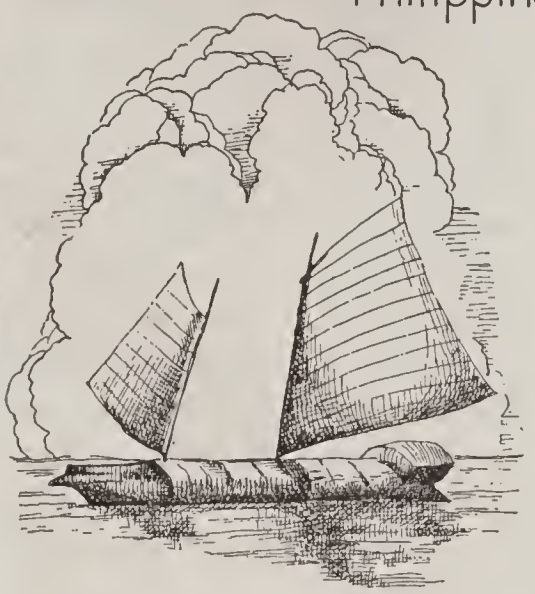
PHILIPPINE ISLANDS



American Type of
High School

Something New in the
Philippines — A Trade School

Wonderful Philippine
Vegetation



A Native Barge

Relative Size of
Negrito and American

A Native Street — before and after American Occupation

the coast they met with no serious opposition except from the Moros. Spanish friars went boldly into the interior, learned the native dialects and converted the only large body of Asiatics that has ever become Christian.

Undisturbed in the next three centuries except by the British occupation of Manila from 1762 to 1764, the Spanish established their government over most of the people, though they never penetrated the interior of the larger islands nor subdued the Moros. The friars dominated all. The typical Filipino village of about the year 1900 contained a well-built stone church, the comfortable residence of the *cacique,* or village dictator, and several hundred poverty-marked huts. Some of the natives were taught to read Spanish, but few of them were permitted to learn to write. Furthermore, there was a strict censorship over all printed matter coming from Europe, nothing with a modern tendency being permitted. Devotional tracts, but not the Bible, were translated into native tongues, and Filipinos were permitted to become priests but not friars, for the friar orders controlled rich lands. At the University of Santo Tomas, founded in 1619, nineteenth-century students of physics were permitted to look at but not to handle the generously-provided and up-to-date apparatus, and studies such as economics were forbidden as works of the devil.

The Awakening. Under such circumstances it is not surprising that the revolt, when it came, was directed not against the Spanish government or the Church, but against the friars and the oppressive and extorting caciques. José Rizal, a Filipino with Chinese and Spanish blood, who had received the degree of M. D. in Madrid and Ph. D. in Berlin, published in 1886 a novel called *Noli me tangere* (Do not touch me), exposing the unfaithful representatives of the Church and their allies, the caciques. Forced to flee to Europe, he later returned and organized a reform party, was banished at the friars' demand, and finally brought from Spain and executed in 1896. The Americans have made the anniversary of his death the national holiday of the Philippines.

The suppression of Rizal's reform movement caused the formation of a secret society, the *Katipunan.* After several hundred of its members had been banished or imprisoned, open revolt came in 1896. Led by Emilio Aguinaldo, a Filipino of one-fourth Chinese blood, the revolutionists successfully fought the few Spanish troops until, in December, 1897, the government paid Aguinaldo and his aids to leave the country, and promised to limit the power of the friars.

The Americans Arrive. All but the young people of the United States remember May 1, 1898, when the news came that Admiral Dewey had sunk the Spanish fleet at Cavite in Manila Bay. Where were the Philippines? What were they? Few knew, and most of those who did

HOME OF NATIVE OF THE INTERIOR

had acquired the knowledge within the week. Then came the treaty of peace and the cession of these unfamiliar islands to the United States for $20,000,000. Many Americans bitterly opposed the acquisition of this empire on the other side of the world, and anti-imperialism became a leading issue in the Presidential campaign which followed.

The first task of the new owners of the islands was military. Aguinaldo had returned, and with the approval of Admiral Dewey he and other insurgents had taken most of Luzon from the Spanish troops. He then claimed that the Americans had promised him to withdraw and leave the islands independent, and for two years he carried on a guerilla war against them. After his remarkable pursuit and capture by Funston, March 23, 1901, American rule was rapidly extended.

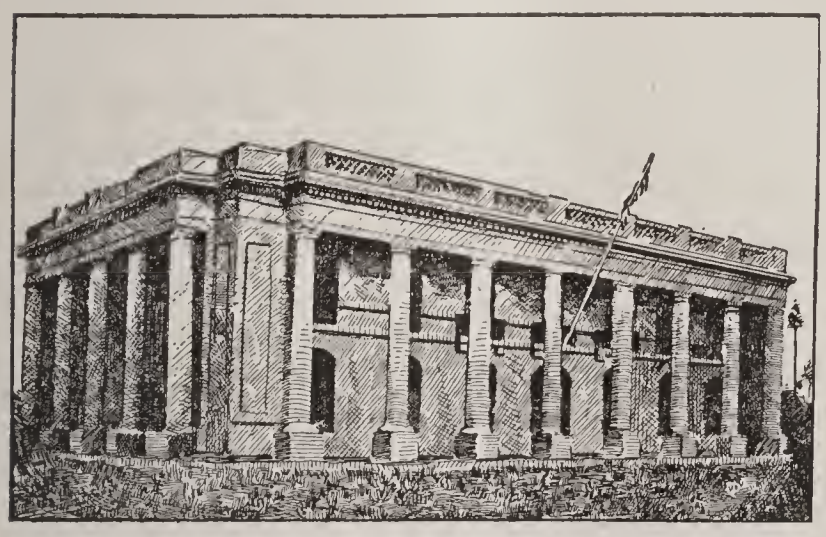
A New Way to Colonize. When the "Yankees" commenced their work in the Philippines, the English, Dutch and other experienced Far Eastern colonizers looked with great interest upon the American attempt to handle an entirely new problem. Six months before the fall of Aguinaldo a civil commission of five, headed by Judge (afterwards President) Taft, and including two professors, a general and a former chief-justice of Samoa, had assumed the government of Manila, and as rapidly as possible was given control over the rest of the territory.

Never before has education been introduced with such wholesale methods as in this new era of the Philippines. One of the commission's first acts was to import a thousand American school teachers, and in districts yet hostile the

soldiers began the work of educating the native children. Of course mistakes were made. Perhaps the most laughable was the purchase of thousands of American school books translated into Spanish, before the discovery that outside of Manila and a few other places Spanish was as strange as Greek. It was soon found, too, that education meant to a Filipino the right to cease work forever, and to combat this, instruction in carpentry, masonry, blacksmithing, printing, gardening, lace-making, basketry and other practical subjects was substituted for all branches of learning but the necessary three R's, the teachers proving by their own example that hand labor was not degrading.

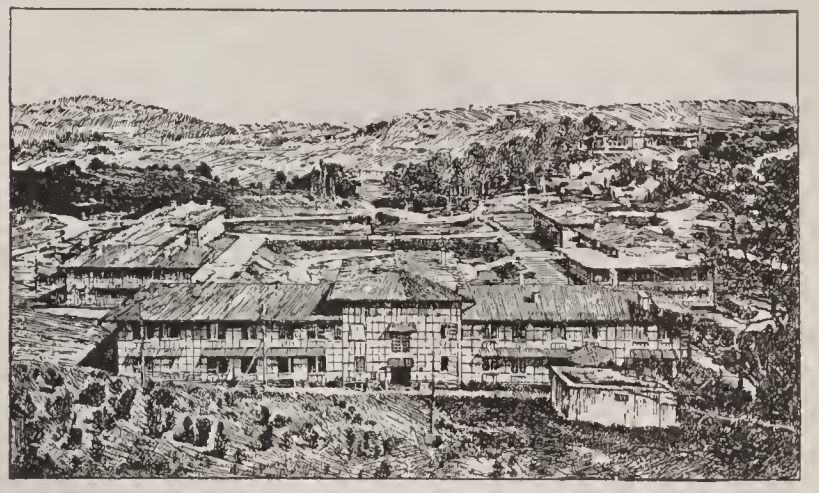
From the first the cost of the school system has been met by the Philippine people themselves. For this reason there are not yet sufficient accommodations to make compulsory education practical, but there are over 600,000 enroled pupils, more than one-third as many as there would be among an equal number of people in Canada and the United States. Nine thousand natives have been trained to become teachers, and as this number increases more schools are organized. For advanced students the University of the Philippines is maintained at Manila, with an attendance of 2,000, to whom instruction is given in any subject or profession from the fine arts to agriculture.

Nation-building surely describes the work of the Americans in their Far Eastern colony. Every act of the civil authorities has had in view the lifting of the native to intelligent citizenship. Nowhere has the effect of mountains upon history been more strikingly illustrated than in the Philippines. Many tribes lived in perpetual hostility to their neighbors because there was no easy means of communication, and because each had its own dialect and could converse with outsiders only in signs.



A PROVINCIAL GOVERNMENT BUILDING
Type of building soon to be seen in each of the provinces.

Acting on the principle that acquaintance promotes friendship, the Americans have penetrated where even the most peaceful friars failed, have built roads, trails and bridges, have made the natives able to talk to each other in English and have substituted inter-village contests in athletics for head-hunting rivalry. None of this work has been done for purely military reasons, as in so many colonies. All the cost has been borne by the natives, and they have been taught to build their own roads and to quarry, cut and lay the stone for their schoolhouses and provincial buildings.



AT BAGUIO
The summer capital of the islands, the seat of government during the heated period of the year. A wonderfully-perfect road has been built from Manila to this spot in the mountains.

The chief task with the Filipinos has been to inspire them with ideas of industry. Some of the most earnest work has been done in the prisons, where inmates were often habitual petty criminals, and so successful has it been that workmen sometimes give as a recommendation that they have served a term in Bilibid. As fast as the lesson of labor is learned it is necessary to provide a means of disposing of its products. Many of the girls and boys knew how to make embroidery which is considered the most beautiful in the world, but they produced it formerly only for gifts to the Church. They had no merchants; nearly all the commerce of Manila and a large share of that of the islands is in the hands of the Chinese, and there is no such thing as a Filipino banker. So the government has established a sales agency, a coöperative institution which supplies materials and designs at cost and purchases finished embroidery, straw hats, baskets and other products at the proper prices.

Sanitation. As in all tropical countries where the United States has entered, a wonderful task has been performed in teaching cleanliness. Plagues of all sorts have been eradicated, and the physical standard of the people has been raised. Doctor Victor Heiser accomplished for

the health of the Philippines what Doctor Gorgas did for the Panama Canal Zone.

Roads, Railroads and Commerce. The first and worst mistake which the inexperienced colonists made in roadbuilding was in overlooking the terrific force of the tropic rainfall. Sometimes over 100 inches of water fall in a year, and twelve inches in a day is not unusual, almost twice as much as in the entire rainiest month in the rainiest parts of the United States. A good macadam road could be washed out in a month, and plain dirt surfacing is commonly of no value at all. The cost of the road fifty-five miles long to Baguio, the summer capital, was estimated at $75,000, but it was not completed until over $2,000,000 had been spent upon it, owing to the fact that even its supposedly solid rock base was dissolved by the freshets. There are now over 1,000 miles of first-class concrete roads in the islands, each kilometer of which has in the rainy season an attendant, or caminero, to keep it in constant repair; in the dry season one man tends two kilometers. There are also 4,000 miles of less permanent roads.

At the end of the Spanish rule there were 120 miles of privately-owned railroad in Luzon. Americans added several hundred miles to this, and they constructed lines in Cebu and Panay, and in September, 1916, the government assumed the control of the Manila Railroad, the most important in the archipelago. Steamship lines between the islands have been encouraged by subsidies, in order to unite their people.

The results of good government are now showing in dollars and cents. Hemp continues to be the most valuable export, but because other articles are increasing in importance it now forms less than half instead of nearly all the trade. Sugar and copra (dried cocoanut meat) bring several million dollars a year. Factories have recently been established to make cocoanut oil in the islands, and in the year ending June 30, 1916, the shipments of it nearly reached the three million dollar mark. Tobacco and its products form another large division of exports, and embroideries, hats and fiber products have increasing sale.

Half the imports of the islands are from the United States, for there has been free trade between the two countries since 1909. The treaty with Spain provided that for ten years Spanish goods should be admitted on the same terms as American, but the tariff makers in Washington did not hesitate to evade their obligations in effect while keeping them in the letter. This they did by giving to both countries a reduction of twenty-five per cent in duties, but imposing the highest tariffs on the classes of goods which Spain produces. From 1904 to 1914 imports from the United States mounted from five to thirty million dollars; the increase in total imports was only two million dollars more. Rice is still brought from Indo-China in large quantities, especially in years of drought.

American Rule, or Self-Government. There are few questions of national or international politics so difficult for an individual to solve without being influenced by prejudiced opinion as is the problem of the future of the Philippines. The Republican party in the United States, which purchased the islands, has always advocated keeping them. The Democrats have as consistently urged giving them their independence; President Wilson in his first message to the Filipinos said:

> We regard ourselves as trustees, acting not for the advantage of the United States, but for the benefit of the people of the Philippine Islands.

Unfortunately, as so often happens, both sides go to extremes in their arguments. In general the Republican attitude is that the United States drove the Spanish out of the islands as a military necessity, that having done so it was its duty to assume the responsibility of governing them, that when it has completed the task of civilizing the people will be the time to consider ceasing guardianship. Acting upon this belief the Republican government inaugurated the tasks of education, sanitation and unification. They gave to the Filipinos an elective legislative assembly, but placed over it the appointive Commission in which Americans were in the majority, so effectively curtailing the actual powers of the people that the phrase "toy government" was in common circulation. The wild tribes were placed in direct charge of the Commission, and the Moros were kept under military domination.

When the Democrats assumed power in 1913 they gave the Filipinos a majority on the Commission, replaced many American civil-service employees by natives and withdrew the soldiers from the Moro country. They introduced the Jones Bill into Congress, providing for the Philippines a government modeled after that of the United States, with both legislative houses elected by the people, the American governor to have veto power, and the Supreme Court of the United States to be above the native courts. Under such an act the relation

OUTLINE AND QUESTIONS ON THE PHILIPPINE ISLANDS

Outline

I. Position and Size

(1) Latitude, 4° 40′ to 21° 10′ north
(2) Longitude, 116° 40′ to 126° 34′ east
(3) Geographic relation to other lands
(4) Extent
  (a) Number of islands
  (b) Size of chief islands
  (c) Actual total area
  (d) Comparative area

II. Physical Features

(1) Mountainous character
  (a) Volcanic and coral origin
  (b) Highest peaks
(2) Rivers
(3) Extent of coast line

III. Vegetable and Animal Life

(1) Typical tropic vegetation
(2) Economically valuable plants
(3) Differing forms of animal life on different islands
  (a) The carabao

IV. The People

(1) Filipinos
  (a) Origin
  (b) Spanish influence
(2) Other Malay races
  (a) Mountain dwellers
  (b) Moros
(3) Negritos
(4) Dress and living conditions

V. History and Present Status

(1) Coming of the white men
  (a) Discovery by Magellan
  (b) Settlements founded by Spaniards
(2) Spanish rule
  (a) Christianization of natives
  (b) Domination by friars
  (c) Revolt under Rizal
  (d) Rise of Aguinaldo
(3) The American rule
  (a) Battle of Manila Bay
  (b) Cession of islands to United States
  (c) Military rule
  (d) Establishment of civil commission
  (e) Education
  (f) Pacification through road building
  (g) Instilling of ideas of industry
  (h) Sanitation
  (i) Transportation and commerce
  (j) Present form of government
  (k) Question of independence or continued American rule

Questions

Why is it not correct to call all inhabitants of the islands Filipinos? Who are the Moros? The Negritos?

How do some of the Philippine tribes account for the formation of their scattered island country?

What influence has difference in location made in the characters of the Filipinos and some of the mountain-dwelling Malays?

What has always been the attitude of the Filipinos toward manual labor? How has the United States tried to combat this?

What is there in the animal life of the islands which seems to contradict the idea that all the islands were once connected?

On what noteworthy expedition was the discoverer of the Philippines embarked? Where and how did he meet his death?

What event is commemorated in the national holiday of the Philippines?

Who was Aguinaldo, and what part did he play in the history of the islands?

What did the United States pay for the Philippines?

What has to a large extent taken the place of head-hunting among some of the partially civilized tribes?

of the islands to the United States would resemble that of Canada to England. The Senate passed the Jones Bill in February, 1916, with an amendment making 1921 the date for complete independence; the House passed it in April, promising independence after a stable government has been established. The first Filipino Congress under the new act met on October 16, 1916, at Manila.

The executive power in the islands is administered by a governor-general, named by the President of the United States.

The chief point of difference now is the answer to the question: Are the Philippine people capable of self-government, and if not, how soon will they be? William H. Taft, who was the first governor, says it will require two or three generations. Other prominent men familiar with the people say that Mr. Taft does not realize the gains since his day. General Pershing, after his difficult task of disarming the Moros, said that it would be some time before they became peaceable, yet the civil government instituted almost immediately afterward appeared to be successful. One side points to such facts as that in the primary election in Manila in June, 1916, which was unofficial and hence unsupervised by Americans, 2,000 votes were polled in one precinct where scarcely more than 100 voters resided. The other side answers that stuffing the ballot box is not unknown in the United States.

Financial considerations plainly influence a part of the opinion on both sides. The bank which represents the largest financial interests in the United States has published arguments against giving up the islands. Americans who have money invested in the islands hint at a future Japanese conquest if the islands are left to themselves, and the Roman Catholic Church quite naturally fears Japan because it is non-Christian. On the other hand many of the advocates of independence for the islands base their chief opposition on the cost of guarding them, which they claim amounts to forty million dollars a year. They do not consider a Japanese invasion probable, but even should one take place, they maintain, Japanese civilization is more suited to the natives than are American standards.

The Filipinos believe themselves capable of self-government—no race on earth lacks such a belief regarding itself. Nevertheless, it is said that when the Jones Bill passed the Senate many of the native leaders suddenly realized that complete independence meant helplessness against outside aggression, perhaps even powerlessness to resist uprisings of the Moros, and they seemed relieved when the House postponed action. In 1921 President Harding commissioned Maj.-Gen. Wood to visit the islands and report on their conditions. Upon his return he received the appointment of governor-general of the archipelago. E.B.H.

Consult LeRoy's *Philippine Life in Town and Country;* Jernegan's *Short History of the Philippines;* Butterworth's *Story of Magellan and the Discovery of the Philippines;* Crow's *America and the Philippines.*

Related Subjects. The following articles in these volumes contain much information that will be of interest in connection with a study of the Philippines:

CITIES

Batangas
Cavite
Iloilo
Manila

HISTORY

Aguinaldo, Emilio
Dewey, George
Spanish-American War
Taft, William Howard

LEADING PRODUCTS

Cocoanut
Copra
Hemp
Rice
Sugar
Tobacco

UNCLASSIFIED

Carabao
Igorrote
Negritos

PHILISTINES, *fil is' tinz,* or *fil' is tinz,* persistent foes of the Israelites in the period of the conquest of Canaan, a mixed people occupying the southern coast of Palestine. They had five fortified cities, Ekron, Ashdod, Gath, Ashkelon and Gaza. Delilah, the betrayer of Samson, and Goliath, the giant whom David slew, are well-known Bible characters who belonged to this people. Saul and Jonathan were slain in the final triumph of the Philistines over Israel, and the fear with which they were regarded is depicted in David's lament in *II Samuel* I, 20:

Tell it not in Gath,
Publish it not in the streets of Ashkelon;
Lest the daughters of the Philistines rejoice,
Lest the daughters of the uncircumcised triumph.

The yoke of the Philistines was permanently broken in the time of the united kingdom under David.

Consult McAlister's *The Philistines: Their History and Civilization.*

PHILLIPS, *fil' ips,* David Graham (1867-1911), an American novelist belonging to that group of writers who have treated in a broad and earnest way the more serious problems of American life. His art was still in process of de-

velopment when his tragic death cut short his career, and his work showed abundant promise of even better things to come. Phillips was born in Madison, Ind. He was graduated at Princeton University in 1887, and began his literary career as a reporter and newspaper correspondent. For a time he was on the editorial staff of the New York *World*. In 1901 he published his first novel, *The Great God Success*. In the next ten years he wrote a long list of novels, all of which revealed a gift for telling a story interestingly; at the same time he introduced ethical and social questions that stimulated his readers to thought, without lessening their interest. Among the best of these is *The Husband's Story,* directed against the low ideals and artificiality of certain classes in high society. Other titles are *The Second Generation, Old Wives for New, The Fortune Hunter, The Hungry Heart* and *The Grain of Dust*. His last book—*Susan Lenox*—was in manuscript form at the time of his death, and was first published in a magazine in 1916. It is a realistic story of the struggles of a young girl in a great city. Phillips was shot to death by an insane person in January, 1911.

DAVID GRAHAM PHILLIPS

PHILLIPS, WENDELL (1811-1884), an American orator and reformer, born at Boston. After graduating at Harvard he studied law for three years but became so interested in the slavery agitation that he neglected his profession. The sight of William Lloyd Garrison dragged at a rope's end by a Boston mob in 1835 determined his future career, for early the next year he joined the abolitionists and became a zealous worker in the American Anti-Slavery Society.

In 1837 at a meeting called in Faneuil Hall to protest against the murder of the Rev. E. P. Lovejoy, an antislavery advocate at Alton, Ill., he delivered an address which many critics consider the equal of Patrick Henry's Williamsburg oration and to approach closely to the sublimity of Lincoln's Gettysburg Address. Henceforth he was looked upon as a leader in the reform movement, but his extremely radical views frequently repelled other leaders. He refused to take the attorney's oath to the Constitution, denounced Congressmen for swearing allegiance to it, and declared the Church an accomplice in crime for justifying slavery by the Bible. He even refused to vote, and demanded immediate abolition or disunion. Even when the War of the Secession had ended he refused to allow the dissolution of the Anti-Slavery Society, until the negro had obtained suffrage, and did not cease this agitation until the passage of the Fifteenth Amendment in 1870.

WENDELL PHILLIPS

He had then been in reforming activities so long that he could turn his mind to no other task, and therefore devoted his energies to a multitude of public questions, such as prison reform, the abolition of capital punishment, prohibition, injustice to the Indian, etc. In the use of wit, invective, epigram and apt illustration he had few equals among American orators. Aside from his fiery antislavery addresses the oration most widely read to-day is the *Scholar in a Republic,* delivered in 1881 before the Phi Beta Kappa Society of Harvard.

Consult Russell's *The Story of Wendell Phillips, Soldier of the Common Good.*

PHILLIPSBURG, N. J., an industrial city in Warren County, opposite Easton, Pa., on the Delaware River, which is part of the western state boundary line, and about sixty miles directly west of Newark. It is on the Central of New Jersey, the Lehigh & Hudson River, the Lackawanna, the Lehigh Valley and the Pennsylvania railroads, and has electric interurban service. The population, which in 1910 was 13,903, was 16,923 in 1920, a 21 per cent gain. The area of the city is about three square miles.

Phillipsburg was settled in 1749 and was chartered in 1862. The commission form of government was adopted in 1913. The city leases all of its utilities. Prominent features are the municipal buildings, a union depot, schools and churches. The chief industrial plants are railroad shops, foundries and machine shops, iron furnaces, sheet-iron, boiler and drill works,

horseshoe and stove factories and silk mills. The combined monthly pay roll of all the industries is $400,000.

PHILOLOGY, *fi lol' o ji,* is the study of language in a scientific manner, not merely to learn its content or the correct method of using it (see GRAMMAR), but with a view to tracing its historical development and shedding light on the history of the peoples among whom it grew up. Philology investigates the laws governing the speech of all human beings of all times.

What the Word First Meant. The development of the meaning of the word itself is of interest. Compounded of two Greek words signifying *love* and *word,* it at first denoted mere "fondness for words;" that is, a philologist was a "talkative person." The change to the present more dignified sense of love of words was very gradual.

Growth of the Science. In its most common present-day application to a comparative study of related languages, with a view to discovering their original connection and their gradual divergence, the word has been used less than a century and a half; for before the latter half of the eighteenth century such a thing as a common stock for languages which had lost all readily perceptible resemblances was unthought of. It was only with the discovery of Sanskrit and of its connection with Greek and Latin that comparative philology began.

After the first suggestions of the possible relations of languages were made, scholars of every nationality took up the study; it was pursued so scientifically that definite laws were discovered according to which it was shown how various branches of common origin had grown away from each other. Most attention has been given to the Indo-European family of languages (see ARYAN), which includes Sanskrit, Persian, Greek, Latin and its derived romance languages, as well as German, English and Norse.

Not One Original Language. The beginnings of speech between human beings, so far as they are known, are discussed in the article on language. Early philologists in their excess of zeal proceeded on the theory that there was in all probability one original tongue, from which all the languages of the world had been derived; and they had optimistic dreams of restoring in some measure that parent speech by picking out the elements, or *roots,* which were common to all languages. Deeper study revealed the futility of such a hope, however, and scholars are to-day practically agreed that the various highly-developed languages of the world are not the outgrowth of a single primitive speech. Not only in vocabulary, but in principles of formation, various languages differ so utterly that it is evident they belong to several groups, or families. Within these groups, of which the most important to Europeans and Americans is the Indo-European, there are subdivisions, based on the principles according to which words and sentences are formed. Thus there are the so-called *isolating* languages, of which Chinese is the most conspicuous example, which show a total lack of inflection; the *agglutinative* (which means running together or adhesive), represented by Turkish, which permit of the combination into one word of a number of separate words, which keep their original meaning and usually their original form; and the *inflectional* class, in which prefixes and suffixes, originally separate words, have lost their identity and become mere inflections. Most of the languages of Europe are of this latter class, though English has shown through the centuries a strong tendency to drop inflections and make use of auxiliary words, thus establishing relations, though distant, with the isolating class.

Where It Meets Popular Interest. Much that has been discovered by philologists, aside from the general relationships outlined above, is too technical to be of interest to any save scholars. In its narrower sense, however, philology presents word-histories which cannot fail to interest anyone who will take the trouble to look them up.

The word *lunatic,* for instance, acquires new meaning if its derivation from the Latin word *luna* is known, for *luna* means *moon,* and the ancients believed that lunacy was governed by changes of the moon, or even caused by bright moonlight. To this day many a superstitious person will not sleep where the moonlight strikes his head or face.

The word *tribulation* shows a curious history. The dictionary defines it as "a state of distress or any severe affliction," and shows that it was taken over bodily from the Latin; but the Latin word *tribulatio* was derived from *tribulum,* the name of a sledge studded with teeth of iron or stone, and used to thresh grain. Thus it means literally a *threshing* or *crushing* as grain is crushed.

The word *character* is used in two ways which at first seem totally different. It means a graphic symbol of any sort, as a letter, a figure,

going back through the Latin to the original Greek word which meant *to cut into furrows, to engrave, to mark;* but it also means the "sum of qualities or features by which a person or a thing is distinguished from others." The connection is not immediately obvious, but a little study shows that this derived meaning refers simply to the stamp or "character" impressed by nature, education or habit.

Manufacture, which has come to have almost exclusively the meaning of producing by means of machinery, is composed of two Latin words, practically unchanged in form, which mean *a making by hand.*

It is possible to multiply such instances in nearly endless number, but the student will find pleasure in tracing them for himself. Any good, unabridged dictionary gives such derivations, tracing them in some instances through various languages before they emerge as modern English words. And even in English itself many words have had a curious and interesting history. Some have become obsolete altogether, some have acquired new meanings which differ widely from the original one. Only with a knowledge of philology in this sense does one acquire the ability to use with precision the words of the English language. A.MC C.

Consult Whitney's *Language and the Study of Language;* Bloomfield's *Introduction to the Study of Language.*

Related Subjects. The reader is referred to the following articles in these volumes:

English Language	Language
Greek Language	Latin Language

PHILOMELA, *fil o me' la,* in Greek mythology, a sister of Procne, daughter of Pandion. Procne became the wife of Tereus, king of Thrace, and bore him a son called Itys. But Tereus grew tired of his wife, and cutting out her tongue that she might not tell her story, shut her up in prison. Then the vile king pretended that his wife was dead, and married Philomela. But the injured Procne wove a web in which she told her terrible misfortune to her sister. Philomela released the captive, and the two sisters in terrible revenge killed the boy Itys and served him to his father as food. This so angered the gods that they changed Procne into a swallow, Philomela into a nightingale, and Tereus into a hawk which always pursues them.

PHILOSOPHER'S, *fi los' o ferz,* **STONE.** See ALCHEMY.

PHILOSOPHY, *fi los' o fi,* "the mother of the sciences," means literally *love of wisdom.* It is said that Pythagoras, the Greek sage, objected to the old name of sophoi (wise men) on the ground that it sounded arrogant, and modestly added the prefix philos, meaning *lover,* or *friend.*

According to the early Greek ideas, philosophy stood for general culture; it embraced "all knowledge." But that was before scientific research had so greatly broadened the field as to make classification necessary. Much of the knowledge that was originally included in the scope of philosophy is now covered by special sciences, like physics, psychology, metaphysics, ethics, logic, and so on; so to-day it is difficult to decide just where philosophy proper begins and where it ends. Probably the closest we can come to a true definition is to say that philosophy is the study of *all* these sciences, considering each one not as something detached and independent, but as related to all the rest. Herbert Spencer called philosophy "a system of completely united knowledge."

Greek Philosophy. The earliest philosopher on record is the Greek Thales, who founded what is known as the Ionic school, as long ago as 600 B. C. He made the first attempt, so far as is known, to get away from the mythological explanation of the universe. The first philosophers considered men but little; their chief subjects of speculation were physical phenomena and the real nature of matter. They developed various systems of natural philosophy, which were ridiculed and criticized by the skeptical *Sophists* who sprang up at the close of this "pre-Socratic" period.

It was Socrates who, as Cicero said, "brought down philosophy from the heavens to earth." He was a *moral* philosopher; that is, the aim of his teachings was to help men to live better lives. His influence led to the founding of many other schools of Greek thought; among these were the *Cynic* and the *Cyrenaic,* forerunners of the *Stoic* and *Epicurean* schools, developing the practical side of his teachings; the *Academic,* founded by Plato, and the *Peripatetic,* founded by Aristotle, developing the idealistic side. The next important phase was that of *skepticism,* a philosophy which, like that of the Sophists, was largely one of denial.

Roman Philosophy. The Romans did not develop any original system, but borrowed from the Greeks. Their characteristic school was the *Eclectic,* represented by Cicero; it was a patchwork of doctrines from Stoicism and other Greek systems, and from Aristotle. A system that originated in Alexandria and spread to

Rome and Greece was *Neo-Platonism,* which was a mixture of Christianity and Greek and Oriental philosophy.

Medieval Philosophy. The Middle Ages produced the philosophic system called SCHOLASTICISM, an application of Aristotle's logic to the basic Christian doctrines. Anselm, Abelard, Saint Thomas Aquinas and Duns Scotus were among the famous teachers and writers of the Scholastic school.

Beginnings of the New Philosophy. Bacon and Descartes are looked upon as the founders of modern philosophy. Bacon, following a path which Aristotle had partly marked out, established a system which has had a marked effect on scientific research—a plan of reasoning which leads from the known to the unknown, beginning with facts and proceeding through investigation and experiment to general truths. Descartes, on the other hand, believed in reasoning from the unknown to the known; in other words, starting with laws reached through thought, and from there proceeding to individual facts.

Modern Philosophy. Present-day thinkers have merely elaborated or modified the older systems, giving them the more practical application which scientific progress has made natural. Among the foremost modern philosophers may be mentioned Hegel, Kant, Herbart, Lotze, Nietzsche and Schopenhauer in Germany; Herbert Spencer, Darwin, John Stuart Mill (see UTILITARIANISM), Locke and Hume, in England; Cousin, Voltaire and Bergson, in France. The only distinguished American school of philosophy is the Transcendentalist, organized in New England in the middle of the nineteenth century, with which were associated the names of Emerson, Thoreau, Alcott, Margaret Fuller and others. The most noted American philosopher of more recent times is William James, the psychologist.

Consult Gomperz's *Greek Thinkers: A History of Philosophy;* Bakewell's *Source Book in Ancient Philosophy;* Jevons' *Philosophy: What Is it?*

Related Subjects. The reader will find more detailed treatment of the various phases of philosophy and its closely connected subjects in the following articles in these volumes:

Agnostic
Altruism
Asceticism
Cynic School of Philosophy
Deductive Method
Esthetics
Ethics
Fallacy
Fatalism
Generalization
Inductive Method
Logic
Materialism
Metaphysics
Mysticism
Optimism
Pantheism
Peripatetic School of Philosophy
Pessimism
Psychology
Rationalism
Scholasticism
Sophists
Stoicism
Transcendentalism
Transmigration of the Soul
Utilitarianism

These volumes also contain articles on the following distinguished philosophers:

Abelard, Pierre
Aristotle
Aurelius, Marcus
Baader, Benedict F. X.
Bacon, Francis
Bacon, Roger
Bergson, Henri L.
Comte, Isidore Auguste
Darwin, Charles R.
Descartes, René
Diogenes
Emerson, Ralph Waldo
Epictetus
Epicurus
Fichte, Johann Gottlieb
Hegel, Georg W. F.
Herbart, Johann Friedrich
Hobbes, Thomas
Hume, David
Hypatia
James, William
Kant, Immanuel
Leibnitz, Baron von
Locke, John
Mill, James
Mill, John Stuart
Newton, Sir Isaac
Nietzsche, Frederick
Pascal, Blaise
Plato
Pythagoras
Schopenhauer, Arthur
Seneca, Lucius Annaeus
Socrates
Spencer, Herbert
Spinoza, Baruch
Strauss, David Friedrich
Thales
Theophrastus
Voltaire
Zeno

PHLOX, *flox,* from the Greek word meaning *flame,* is the name of a group of flowering herbs, natives of North America. They are so called because of the brilliant scarlet blossoms of many of the species. These plants are hardy and grow readily in fertile soil, and many varieties have been developed by gardeners. One of the best-known species is the *Drummond phlox,* which originally grew wild in Texas. All annual varieties of phlox are derived from this. The flowers of this group show a wonderful range of color—creamy-white, pale yellow, deep pink, salmon-pink, magenta, purple, lilac and crimson—and many are star-shaped. The familiar wild *sweet William,* whose bluish flowers are among the early summer blossoms, also belongs to the phlox group. Annual varieties of phlox are grown from seeds; the perennials from seeds and from stem and root cuttings. See ANNUALS; PERENNIALS.

When May, with cowslip-braided locks,
Walks through the land in green attire,
Then burns in meadow grass the phlox
His torch of purple fire.
—BAYARD TAYLOR.

PHOCION, *fo'shi on* (about 402-317 B. C.), an Athenian general and statesman, famed as the opponent of Demosthenes. In his youth he was a pupil of Plato. He first came into prominence in 376, when he held a subordinate command at the important battle of Naxos, and by the middle of the fourth century B. C. he had become one of the foremost men in Athens. The great question before the Athenian people at that time was that of the relation between Macedonia and the other Greek states; Demosthenes and other orators thundered against Philip of Macedon and urged Athens to resist him at any cost; Phocion, fully as patriotic, felt that resistance to the strong power of Macedon would be useless and disastrous, but was never able to convince the people of the wisdom of his point of view. Several times he was successful in battle against Philip, and was always able to make better terms with the Macedonians when they were victorious than anyone else could have done.

In his old age, he became involved in political intrigues which compelled him to take refuge among the Phocians. They, however, delivered him up to the Athenians, who forced him to drink poison. Not long afterward, the public temper changing, a statue was raised in his honor and public funeral obsequies were held.

PHOEBE, *fe'be,* a small, grayish-brown bird of the flycatcher family, common throughout Eastern North America in summer, and migrating in winter to the Gulf states. In Canada it is found in the neighborhood of Montreal and westward to west Ontario. It takes its name from its monotonous call, "pewit, phoebe; phoebe, pewit," continuously repeated, as it flies about in search of a habitation. It stays about houses and barns, often returning spring after spring to the same yard to nest on rafters or beams. The nest is bulky, built of moss and mud and lined with grasses and long hairs. The eggs are four to six in number, and are white in color, sometimes spotted with cinnamon. The phoebe preys on insects, which it captures while it is on the wing, and it is therefore of benefit to farmers.

PHOEBE AND NEST

Say's phoebe is a species found west of the Rocky Mountains. The common phoebe is also known as *pewee* and as *pewit*. The *wood pewee* (which see) is a different species of flycatcher.

PHOENICIA, *fe nish'i a,* the first really great commercial power among nations, is one of the countries of great antiquity. It was a part of the land of Canaan of the Old Testament. Nobody knows when it had its beginnings, but by 1500 B. C. it had had a fairly long history, and its cities then were large and prosperous. It was situated on the extreme eastern Mediterranean shore, extending from the Eleutherus in the north to Mount Carmel in the south, a distance of nearly 200 miles. On the east were the mountains of Lebanon, whence came the famous "Cedars of Lebanon." The actual boundaries of this country are as uncertain as its early history, but its influence was greater than that of any contemporary power.

LOCATION MAP
The black area bordering the sea is Phoenicia.
(*a*) Land of the Hittites
(*b*) Syria
(*c*) Israel
(*d*) Philistia
(*e*) Judah
(*f*) Moab
(*g*) Ammon

It has always been maintained that the Jews were not fond of the sea and could never have become a maritime power; however, the inhabitants of Phoenicia were of Semitic origin and became the leading power of the world. Their commerce was sea-borne from the uttermost parts of the world then known. Their vessels sought out every available trading post in the Mediterranean and even passed the Strait of Gibraltar, sailed north and returned laden with tin from the mines of Cornwall, England. There is a legend coming down from the Latins that other nations' sailors never ventured far beyond Gibraltar into the unknown sea; that they posted the information, *"Ne plus ultra"* (no more beyond), and dared not venture farther for fear of the monsters of the deep, but that Phoenician merchantmen erased the first word and proved the existence of other trading fields.

Phoenician priest

The supposed tomb of Hiram

A coffin

The ruins of Tyre, from the mainland

Phoenician vases

Ancient fortress, Sidon

The Phoenicians had practically no natural advantages. Their country was merely a narrow strip hemmed in by mountain, desert and sea, surrounded on the landward side by warlike and hostile tribes; this probably accounts for their selection of the sea for their path to greatness. They were not a warlike race, but they created a great naval power to protect their commerce. Their vessels carried tin from England; gold, pearls and frankincense from Arabia; silver from Spain; slaves, ivory and skins from Africa; linen from Egypt; copper from Cyprus; purple dye from the celebrated purple fish, from Tyre, and ingeniously wrought silver and brazen vessels from Sidon. They were noted for their improved alphabet, their skill in building and in the casting of metals and in mining, and for their methods of dyeing cloth and glass.

The Phoenicians colonized Cyprus, the southern coast of Asia Minor, Southern Spain, Sicily, Sardinia and the northern coast of Africa. With these colonies they traded, and established themselves the carriers of merchandise to and from all parts of the known world. Confining themselves to commerce, the Phoenicians flourished. Commercial riches, however, created the desire for luxuries; luxuries created idleness, and the power of Phoenicia waned.

Their Religion. Like the Assyrians, the Phoenicians adhered to a religion which was cruel and debasing. Their gods were formerly merely earthly people who were gradually given heavenly attributes. Astarte, the moon goddess, was also the goddess of love. Baal, the sun god, was supposed to delight in human offerings, and to him in times of national calamity it was customary to sacrifice every first-born child. There was, however, no one particular Baal, each city having its chief deity called by the name Baal, who was responsible for the fertility of the soil and for the general prosperity of the city. Astarte is the Phoenician form of Aphrodite and Venus, with whom she was identical. The worship of Astarte was conducted with revolting rites of debauchery. The Moloch of the Old Testament was, in Phoenicia, the god Milk, who took particular pleasure in the sacrifice of infants by burning. Of their mighty temples, built with years of sacrificing labor, few traces remain. Of the great sanctuary of the Baal of Tyre, not a sign can be discovered.

Principal Cities. Tyre and Sidon, each a magnificent city with fine harbors, formed the centers of Phoenician commerce, manufacture and art, while on the other side of the Mediter-

ranean, on the north coast of Africa, was springing up Carthage, a Phoenician colony which was long to dispute with Rome the mastery of the world. Acre and Beirut, Sarepta, mentioned in *I Kings* XVII, 9, as Zarephath, and Arwad, now known as Ruad, were all maritime cities. Of them all Tyre and Sidon stand out as most important, Tyre as the great colonizing power, Sidon as the commercial and manufacturing center.

Politically, Phoenicia had little power or ambition and in time submitted to more powerful neighbors. Its cities and its navy, however, made it indispensable in the scheme of world politics, and though after 850 B. C., Phoenicia became tributary in turn to Assyria, Babylonia, Persia, Egypt, Greece and Rome, its position was more that of a helpful ally than of a subject state. Until its conquest by Alexander the Great in 332 B. C., it maintained its commercial supremacy.

Of the once famous "Cedars of Lebanon" that crowned the slopes of the northern boundary none remain. The land there lies desolate. The harbors of Tyre and Sidon no longer are deep enough for ships of commerce. King Solomon obtained from Hiram, king of Tyre, the cedar needed to build the Temple, and the artisans required for the work, for he had none with "skill to hew timber like unto the Sidonians." F.ST.A.

Consult Rawlinson's *History of Phoenicia;* Sayce's *Ancient Empires of the East.*

Related Subjects. The reader who is interested in Phoenicia is referred to the following articles in these volumes:

Acre	Carthage
Alphabet	Lebanon, Mountains of
Baal	Sidon
Beirut	Tyre

PHOENIX, *fe'niks,* a bird famed in fable, held sacred by the Egyptians and said by Herodotus, the "father of history," to have come to Egypt every 500 years from Arabia. It was supposed to have red and golden plumage and to resemble the eagle in size and form.

Of the many fanciful tales related of the phoenix perhaps the best known is that when it was ready to die, at the age of about 500 years, the bird built itself a nest of herbs, lighted it by fanning with its golden wings, and then died upon it. From the ashes a worm was generated whence grew the young phoenix. Pliny declared it to have been the belief that there was but one phoenix on earth at a time, and when it died upon the pyre it had erected, the worm which developed from the ashes became in its turn the only representative of the species. Another legend tells of the sweet song of the phoenix given at the rising of the sun.

The modern use of the word is based upon these old legends. When a new building is at once erected upon the ruins of one destroyed by fire, it is said to "rise phoenixlike from its ashes."

PHOENIX, ARIZ., the capital of the state and the county seat of Maricopa County, is situated in the fertile valley of the Salt River. It is south of the geographical center of the state, 450 miles east and south of Los Angeles and 150 miles northwest of Tucson. It is served by the Arizona Eastern and the Topeka & Santa Fe railways. The population in 1910 was 11,134; in 1920 it was 29,053 (161 per cent gain).

Phoenix has a dry and healthful climate and is a favorite winter resort. The streets and parks are made attractive by semitropical vegetation, and there are many beautiful residences. Prominent structures are the state capitol; the Federal building, completed in 1914 at a cost of $150,000; the Y. M. C. A. building, costing $100,000; the Agricultural Experiment Station, city hall, Carnegie Library, Arizona School of Music, hotels and hospitals. Three miles north is the Phoenix boarding school for Indians, supported by the United States government. In the vicinity are remains of old Aztec Indian dwellings, Indian rock writing and mounds.

Phoenix is in the finest farming district in the state, and agriculture is the principal source of revenue. Egyptian cotton, grapefruit, oranges, olives, dates and grain are the leading crops, and the earliest markets are supplied with cantaloupes, strawberries, apricots and garden truck. Hay and alfalfa are extensively raised for the feeding of cattle and sheep from the ranges, brought into town for shipment. Orchards and fields are irrigated with water from the Roosevelt Dam, which is about seventy miles northeast of the city. There is some mining near Phoenix, and the city has sugar-beet and canning factories.

Settled in 1870 and incorporated in 1881, Phoenix became the capital of the territory in 1889. In 1912, the year in which Arizona was admitted as a state, the commission form of government was adopted. The water system is owned by the municipality.

PHOENIXVILLE, *fe'niks vil,* PA., a borough in Chester County, in the southeastern part of the state, twenty-eight miles northwest of Philadelphia. It is on the Schuylkill River and

Canal, and on the Pennsylvania and the Philadelphia & Reading railroads. The population, which in 1910 was 10,743, was 11,714 (Federal estimate) in 1916. Phoenixville has large iron and steel mills, and manufactories of boilers, hosiery, underwear, silk and structural steel for bridges. Prominent features of the borough are Reeves and Reservoir parks, a Carnegie Library and Moose Home. Phoenixville was settled in 1732 and incorporated in 1849. V.N.S.

PHONETICS, *fo net' iks,* the science of the sounds of speech and their representation by alphabetic characters. It concerns itself at the outset with the vocal organs and their relations to each other, whereby articulate speech is produced; with the resonance cavities of larynx, pharynx, nasal passages and mouth and the effect produced by them on the air expelled from the lungs. Many sounds which to the casual observer seem identical are shown by such close study to differ in their method of production and hence in their actual phonetic value.

Phonetics have a practical value in the learning of a new language; for the surest way of acquiring the correct pronunciation of sounds in a foreign language which differ from those in the native tongue is to ascertain and exactly reproduce the relative positions of the vocal organs. Without the knowledge of phonetics, too, people born deaf and dumb could never be taught articulate speech.

The Phonetic Ideal. A detailed technical discussion of the speech sounds of the English language with their phonetic values is beyond the scope of this article, but there are certain general facts which are worth the attention of anyone interested in the study of languages. The phonetic ideal is an alphabet which has a symbol for every sound used in the language, and no unnecessary symbols. Perhaps there has never been an alphabet which fulfilled these conditions; surely there is none to-day. Some languages are, however, far more nearly phonetic than others; thus the Spanish has very few exceptions to its sound system, and the German is a close second. In German, almost every letter of the alphabet has but one sound, and there are few silent letters in words, practically all exceptions being covered by a few definite rules.

Phonetic Weakness of English. With English, however, the case is quite different. With the possible exception of French, no other language equals it in irregularities and arbitrary distinctions. English speech calls for certain sounds which the Latin people did not use, and for these the Latin alphabet, adopted almost without a change, afforded no symbols. In many instances, too, pronunciations have changed, and words which were formerly phonetic are now distinctly not so. How far the English alphabet fails of being a perfect phonetic medium may be seen by an examination of letters *A, E, I, O, U, C, G, J* and *S* and their sounds. Each of the vowels is forced to do duty for several sounds, the first for no fewer than eight; and occasionally these sounds overlap, or duplicate the pronunciation of certain diphthongs; *C* is an unnecessary letter, except in such combinations as *ch,* for one of its values is equally well represented by *k;* the other by *s.* These facts taken in conjunction with the very frequent silent letters, show why English is so difficult a language for a foreigner to master. Few of the European languages are so difficult.

Why Reform Is Slow. A number of attempts have been made to reduce English to a really phonetic basis. Phonetic alphabets, wherein each sign represents, wherever it is found, one definite sound value, have been suggested by various scholars, the English alphabet being taken as a base, with such additions and subtractions as were absolutely necessary. Some of these schemes have found ardent defenders, but it seems impossible that any of them should ever receive full support. And, strangely, the chief argument against them is the very need for them: if phonetic divergences were less common, they might be corrected and yet leave the language practically as it stands; but a wholesale sweeping away of all the irregularities would render all previously written books almost as difficult for the uninitiated reader as if they were in a foreign language. A.MC C.

Consult Bell's *Sounds and Their Relations;* Sweet's *The Sounds of English;* Jones's *The Pronunciation of English.*

Related Subjects. The reader is referred to the following articles in these volumes:

Deaf and Dumb, subhead, *The Edueation of Deaf-Mutes.*
English Language
Voice

PHONOGRAPH, *fo' no graf,* the technical name for the popular *talking machine* (which see).

PHOSPHATES, *fos' fates,* compounds of phosphoric acid and some other substance. They are abundant in nature, occurring in phosphate rocks in combination with lime and magnesia; in the remains of animals (bone ash) and of plants (vegetable mold). Phosphates are necessary to the growth of plants and ani-

mals. When crops are produced year after year on the same soil the natural supply of phosphates is gradually removed, and artificial fertilizing by means of manure becomes necessary. Phosphate rock is the chief source of fertilizer containing phosphates. By crushing the rock and treating it with sulphuric acid a soluble fertilizer known as superphosphate is made, which acts much more quickly than the pulverized rock.

Great quantities of fertilizing phosphates are found in beds of leached guano on certain islands of the Pacific, in the West Indies and in Venezuela; on Christmas Island, in the Pacific, there is a bed 100 feet deep yielding nearly 300,000 tons a year. See FERTILIZER.

PHOSPHORESCENCE, *fos fahr es' ens,* from the Greek *phos,* meaning *light,* and *phoros, bringing light,* the emission of a pale, sometimes ill-defined, light, by bodies possessing the quality of becoming self-luminous after exposure to light. It does not have its origin in combustion. The substance in which this peculiarity was first noticed was barium sulphide, the discovery of a Bologna shoemaker in 1602. It was quickly found that there were many other bodies to be added to the list. The ancients knew that a diamond when slightly heated became phosphorescent, and Pliny mentions other gems which cast off a light of their own when in darkness. The color of the phosphorescent light is influenced by the kind of light to which the substance has been exposed, and varies with the nature of the substance. After being exposed to sunlight, calcite gives an orange light, while argonite gives a green light under the same circumstances.

Phosphorescence must not be confused with the luminosity of phosphorus. The light coming from phosphorus is caused by oxidation and does not depend on previous exposure to light, while phosphorescence is the direct result of such exposure. The application of heat will cause some substances to become luminous in a darkened room; in some cases, notably with a variety of fluorspar, the heat of the hand is sufficient, but every case demands previous exposure to light.

Experiments have proved that there are a great number of substances which become self-luminous after exposure to light, in some cases the phosphorescence lasting only the fraction of a second, in others lasting for days. Mechanical appliances have been used to detect phosphoresence of such short duration as to be invisible to the human eye. It has also been shown that the vividness and duration of phosphorescence of many substances, especially calcium sulphide, depend on the presence in that substance of impurities, such as manganese, bismuth and copper. Gelatin, celluloid, paraffin and ivory are phosphorescent at very low temperatures, while certain other substances are phosphorescent only when subjected to friction.

The most interesting cases of phosphorescence occur in the animal world, the luminous property belonging to nearly every main group of the zoölogical series. Phosphorus being highly poisonous to all animal tissues, it is apparent that it can play no part in animal luminosity. In some of the lowest forms of life the whole body is phosphorescent, as in the case of the jelly fish. In other organisms, such as the firefly and glowworm, the luminosity is localized and produced by a highly efficient but minute mechanism. Whether phosphorescence is attractive or protective is a matter of conjecture, though it is commonly supposed that in the case of the firefly the luminosity is designed to attract. Probably in some insect life phosphorescence indicates the presence of disease. The great displays of phosphorescence in sea water are due to the presence of innumerable phosphorescent organisms and are not derived from the water itself. F.ST.A.

PHOSPHORIC, *fos fahr' ic,* **ACID,** an acid of phosphorus made by dissolving the white vapor formed by burning phosphorus in air or oxygen in water. It may also be produced by treating yellow phosphorus with dilute nitric acid and evaporating the solution, when it forms in colorless crystals. Phosphoric acid enters into all the compounds known as phosphates, some of which have a wide range of usefulness. See PHOSPHATES; PHOSPHORUS.

PHOSPHORUS, *fos' fahr us.* The ancient Greeks were acquainted with a yellow, waxy substance that glowed in the dark, which they named *light bearer.* The Greek words for this name when united form the word *phosphorus.* Common phosphorus is a yellowish, waxlike substance that has the odor of a burning match. When exposed to the air in a dark room it glows, or is *phosphorescent.* It burns at ordinary temperatures, and melts at about 98° F. Phosphorus is very poisonous, and it is unsafe to handle it unless it is under water. Burns from it are difficult to heal, and a small dose of it will cause death. Because of its liability to take fire it has to be kept under water.

Until recently the chief use of phosphorus was in the manufacture of matches (which see),

but the dread disease known as *phossy jaw,* which is a rotting of the jaw bones, has led to the prohibition of its use in most countries where matches are produced. All workmen engaged in the manufacture of phosphorus suffer from bone diseases.

When burned in a good supply of air, phosphorus forms the dense, white vapor called phosphoric oxide, which immediately absorbs water from the air and dissolves, forming phosphoric acid. When compounds of phosphorus are heated to a high temperature in closed vessels the phosphorus distills, and the vapor, when collected over water, is changed to a yellow liquid that settles to the bottom. The most extensive phosphorus works are at Oldbury, England; Lyons, France; and Niagara Falls. Bone ashes and phosphate rock are the substances most generally used in its manufacture.

Phosphorus is necessary to the growth of plants and animals. The plants take phosphorus from the soil and animals obtain it from the plants. It is found in the bones, and in the brain and nerves in larger proportions than in any other animal tissues.

Red phosphorus, an allotropic form (see ALLOTROPY), is made by heating ordinary phosphorus to a high temperature in a closed vessel. It is a brownish-red powder and does not burn, nor does it melt except at high temperatures. Phosphorus is a nonmetallic element (see CHEMISTRY, subhead *Elements*). It is not found free in nature, but exists in plants and animals and in phosphate rocks.

PHOTIUS, *fo'shi us* (about 820 - about 891), an eminent Byzantine prelate and statesman, a man of great intellect and literary power, celebrated because of his interest in the separation of the Eastern and Western churches. He was born in Constantinople, and was elevated from the standing of a layman to the patriarchal dignity of secretary of state to Michael III. Pope Nicholas I deposed him in 862, but Photius in turn deposed and condemned Nicholas in 867, thereby laying the foundation of the schism between the Eastern and Western churches. In the same year Photius was exiled, but later was restored to patriarchal dignity. He was again exiled in 886 by Leo the Philosopher, and he died in an Armenian monastery. Biographers disagree as to the character of Photius; those of the Roman Catholic Church accuse him of craft, perfidy and violence, while the Greek Church has canonized him.

PHOTO-ENGRAVING, *fo'toh en grayv'ing,* is the process of preparing engraved plates or blocks for printing by means of photography and etching. The plates are prepared on two general plans, one in which the background is etched away, leaving the design or picture to be printed in relief, and the other in which the design is etched into the plate, leaving the background in relief. The first is known as *relief* photo-engraving, and the second as *intaglio* photo-engraving, or photogravure. Both depend upon the principle that certain substances, such as gelatin, some forms of albumen and bitumen, harden under the action of light, so that they are not soluble.

Relief Photo-Engraving. In making a plate in relief for the reproduction of linework, a glass plate coated with a film of gelatin and potassium bichromate is exposed under a black and white negative. The film is then soaked in water, and the lines swell that were protected by the dark parts of the negative, while the other parts of the film do not swell. The film is then laid in a mold, and a wax or plaster impression of it is taken. From this impression an electrotype is made. With the mounting of the electrotype on the block or plate for the printing press the process is completed.

The halftone (which see) is the most common form of relief photo-engraving, and may be made one of the most effective.

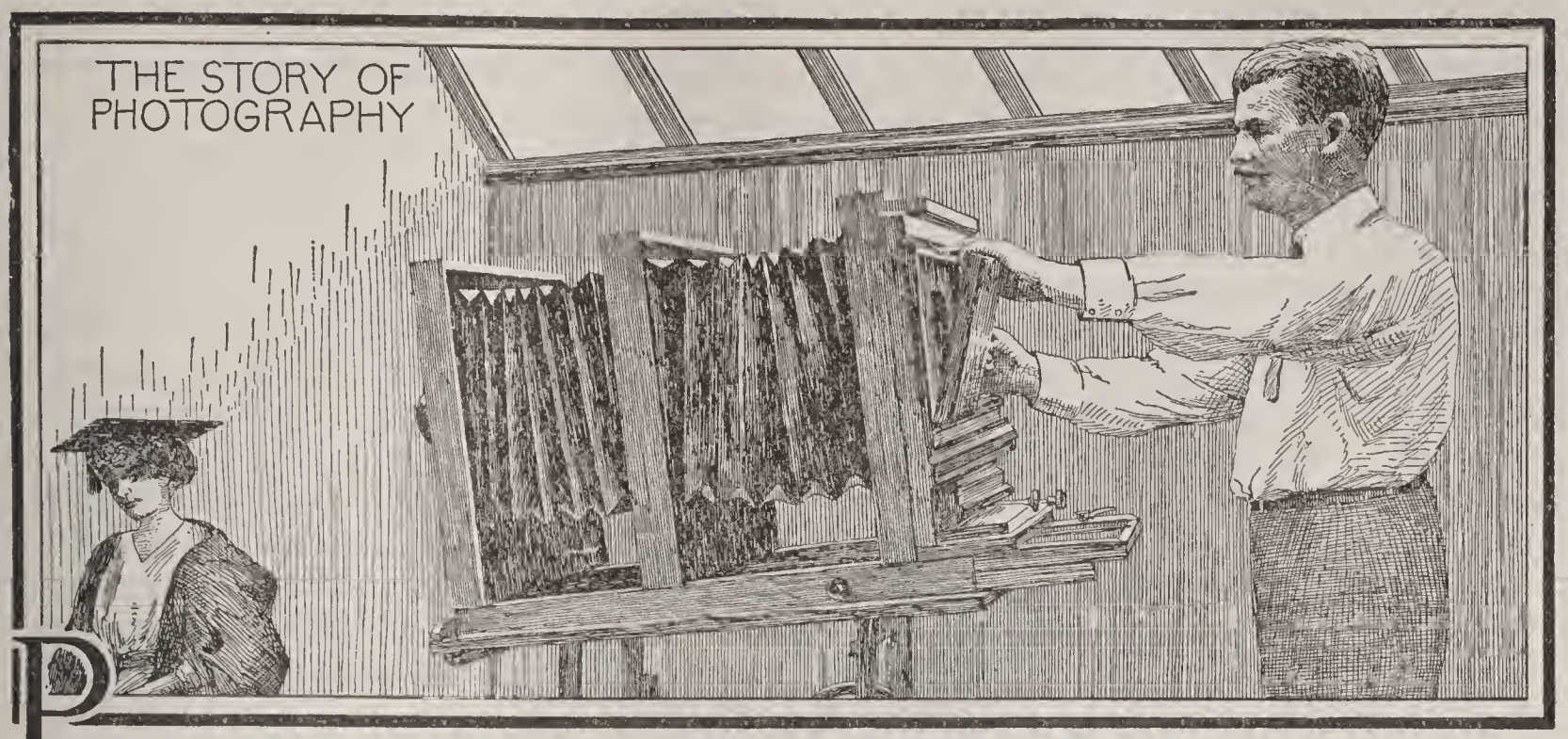
Photogravure. In the photogravure process a copper plate, covered with a sensitized film, is exposed to a black and white positive, or photograph, on glass. The parts under the clear spaces are hardened and those under the shaded parts corresponding to the shades in the picture remain soluble in varying degrees. The plate is then washed and the soluble portions of the film are removed, leaving the metal bare. The plate is then etched and hardened. The grain often seen in photogravure pictures is produced by sprinkling the plate with powdered resin, which is heated in.

The photogravure process is employed in the reproduction of etchings, fine engravings and other works of art where an exact reproduction is desired. It is also in general use in preparing illustrations for books. For this purpose a less expensive process of preparing the plate is used, and plates are often prepared for rotary presses for rapid work.

Consult Jenkins' *Amstutz's Handbook of Photo-Engraving.*

Related Subjects. The reading of the following articles in connection with this topic is recommended:

Engraving	Halftone
Etching	Intaglio



PHOTOGRAPHY, *fo tog'ra fi,* which means the *art of writing with light,* has become a fine art that is practiced throughout the world. Photography has been brought to such a degree of perfection that there is scarcely an object in nature that is beyond the reach of the camera. While the more common purposes for which photography is employed are the making of portraits and the reproduction of landscapes, it is of great value in the scientific world. The camera and the telescope have made possible complete charts of the heavens, in which every star visible is located, and they have enabled us to make pictures of the moon and planets that give an idea of their structure. By use of the electric light, objects can be photographed under water, and pictures are now common that show the natural surroundings and movements of fish and other aquatic animals. By attaching the microscope to the camera the wonders of insect life are pictorially recorded. Formerly the naturalist hunted wild animals with the rifle and studied the mounted specimens, but now he hunts them with the camera and photographs them among their native surroundings so as to show their grace and beauty.

Processes. Modern photography includes three processes—the exposure of a sensitized plate to secure the picture, the development of the picture, or making the negative, and printing the positive. In photography these processes are known respectively as *exposure, development* and *printing.*

Exposure. The sensitized plate consists of a piece of glass or celluloid film, one surface of which is covered with a film of gelatin containing a composition of silver and bromine, that is, silver bromide, which is exceedingly sensitive to the action of light. The exposure is made by means of the camera (which see). In making the exposure the photographer first secures upon the ground-glass screen of the camera a distinct image of the object. The lines of this picture should be sharp, and all the details should be clearly brought out. The length of the exposure is determined by the sensitiveness of the plate and the strength of the light; the best cameras have attachments that can be adjusted quickly to meet any ordinary conditions, the exposure being made by opening and closing the shutter by means of a rubber-bulb air pressure in the hand of the operator.

Developing. The plate or film does not show the effect of the exposure when taken from the camera, and developing is necessary to bring out the picture. This is usually done in the *dark room,* which is illuminated by a lamp whose flame is enclosed in a red- or an orange-colored glass globe, since these rays will not affect the sensitized film. The plate is placed in a shallow tray containing a developing fluid, and the tray is gently rocked so that the fluid may act upon all parts of the film. The developer dissolves the bromide that has not been acted upon by the light and leaves the silver, which forms the dark parts of the picture. The strongest lights and shadows appear first, and the details of the picture follow. The operator must watch the process carefully, and when the details of the picture are brought out, the plate should be taken from the solution, washed and placed in a solution of hyposulphite of soda and alum, known as the *fixing bath.* This solution dissolves all the silver bro-

mide that has not been acted upon and leaves the picture clear and sharp. The developing process is now completed, and the picture, called the *negative,* should be thoroughly washed in running water, then placed in a rack to dry. The developed plate is called the negative because in it the lights and shadows of the object photographed are reversed.

Printing. The final step in the process consists in printing the *positive,* which is the photograph as we know it. Photograph paper is prepared by coating one surface of a light paper with albumen, to which has been added a small quantity of ammonium or sodium chloride, then soaking the paper in a solution of nitrate of silver. Many grades and styles of this paper, already prepared, are on the market. The film surface of the negative is laid upon the sensitive surface of the paper and the two are fastened together in a printing frame and exposed to the light. The time required for printing depends upon the nature of the negative, the sensitiveness of the paper and the strength of the light. Since the paper is less sensitive than the film, the exposure for printing must be longer than that for making the negative. When the print has reached the desired shade it is taken from the frame, washed and placed in a fixing bath. After fixing it is washed and dried.

The great variety of effects produced in photography is due largely to the varieties of printing papers. A rough paper produces a soft picture without sharp lines. If bromide is used instead of silver in preparing the paper, a brown picture is obtained, and combinations of these substances in different proportions give different tints. The blue print (which see) is made on a paper sensitized with a solution of potassium ferro cyanide.

Progress in Photography. Photography is a recent art. The first practical application of it was made by Daguerre in 1839 (see DAGUERROTYPE). The first sunlight picture of the human face was made by John W. Draper of the New York University in 1840, and the photograph as we know it has been developed since 1850. But, notwithstanding the fact that the art is less than a hundred years old, photography has reached such a stage of perfection that almost incredible results are achieved by it. Films so sensitive that a mere flash of light upon them will produce a complete picture are in such general use that they cause no comment, and their perfection made the moving picture possible. The extent to which these pictures are used in scientific research is given in the article MOVING PICTURES (which see). Naturalists have traveled to remotest regions and suffered untold hardships to photograph birds and animals in their native surroundings, and the reproduction of these photographs places them within the reach of every boy and girl. Photography has become an indispensable agency in education, and every leading educational institution includes a complete photographic outfit among its equipment.

Apparatus for taking photographs under water has been perfected, and excellent views of fish and other submarine life are made. In the War of the Nations the camera and the aeroplane enabled the officers of the contending armies to learn many facts concerning the location and strength of the enemy's lines. New processes are perfected and new devices are brought to light from year to year, and there is not an industry or an art to which photography does not render valuable assistance.

Amateur Photography. Since the invention of the kodak the pleasure of "taking pictures" has been within the reach of every one, and all appliances and material have been perfected to such a degree that any boy or girl can use the camera, develop the films and print the photograph with success. A few hints to the beginner may be of assistance:

1. Get a camera with a good lens. If possible, focus a picture on the ground-glass screen and study the clearness of the details before purchasing.

2. Study the book of directions carefully, and follow the directions to the letter.

3. Before making an exposure, study carefully the object to be photographed. Note the light and shade effects. If you are photographing a landscape see that no undesirable objects appear in the foreground in the field of the camera. Place the camera so that the sky line will be above or below the middle of the picture.

4. Use an actinometer until you have gained enough experience to time your exposures.

5. If you do your own developing better results will be secured by using the developing tank than by the ordinary apparatus in the "dark room."

6. Be sure that your negatives and prints are *thoroughly washed.* This means that you must wash them three or four times.

Color Photography. Photographing objects in their natural colors has been brought to such a degree of perfection that almost perfect reproductions of the object can be made. The process is more complex than that in ordinary photography, and may be most easily understood from a description of the process through which the first successful pictures were ob-

tained. It is known as the *Lumière* process, from its discoverers, the Lumière Brothers of Lyons, France. The sensitive plate is prepared by covering one surface of the glass with starch granules, alternately red, green and blue. A preparation sensitized to all the colors of the solar spectrum is then poured over these granules. The plate is placed in the camera with the glass side towards the lens so that the light in reaching the sensitized film passes through these colored granules. The plate is then developed into a positive, and a picture of the object in its natural colors is the result. Prints reproducing these colors cannot as yet be made from these positives, for the secret has not been learned, but three- and four-color halftones are successfully made from them. W.F.R.

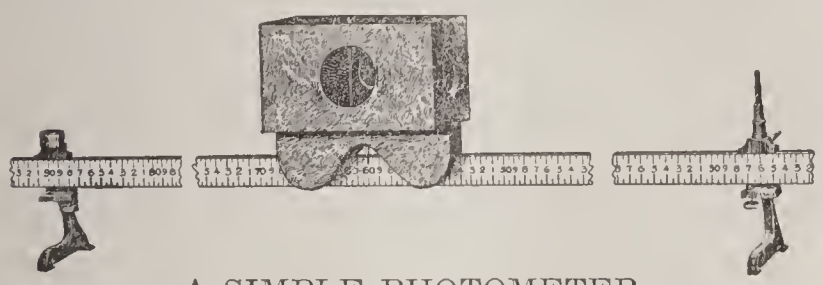
Consult Adams's *Amateur Photography;* Holland's *How to Use a Camera;* Taylor's *Why My Photographs Are Bad.*

Related Subjects. The reader is referred to the following articles in these volumes:

Camera	Lens
Daguerrotype	Moving Pictures
Halftone	Photo-Engraving

PHOTOGRAVURE, *fo toh gra vure'.* See subhead, in article PHOTO-ENGRAVING.

PHOTOMETRY, *fo tom' e tri,* the science of measuring intensities of light by comparison with a standard unit. The brightness of the illumination depends on the source and the distance away. Various units are employed, such



A SIMPLE PHOTOMETER

It consists of a graduated rod one meter (39+ inches) in length, mounted on two supports. One of the supports bears a gas jet, and on the other is a candle holder. A box painted black (so it will not cast reflections) slides along the meter rod, and contains a Bunsen screen with two mirrors at right angles, for viewing both sides of the screen at the same time.

as the British sperm candle, the standard electric lamp, etc. The sperm candle burns 120 grains of material an hour and is seven-eighths of an inch in diameter. Daylight is estimated at 180 candle per square yard, meaning the amount of light that 180 candles would throw on a square yard of surface at a distance of one foot.

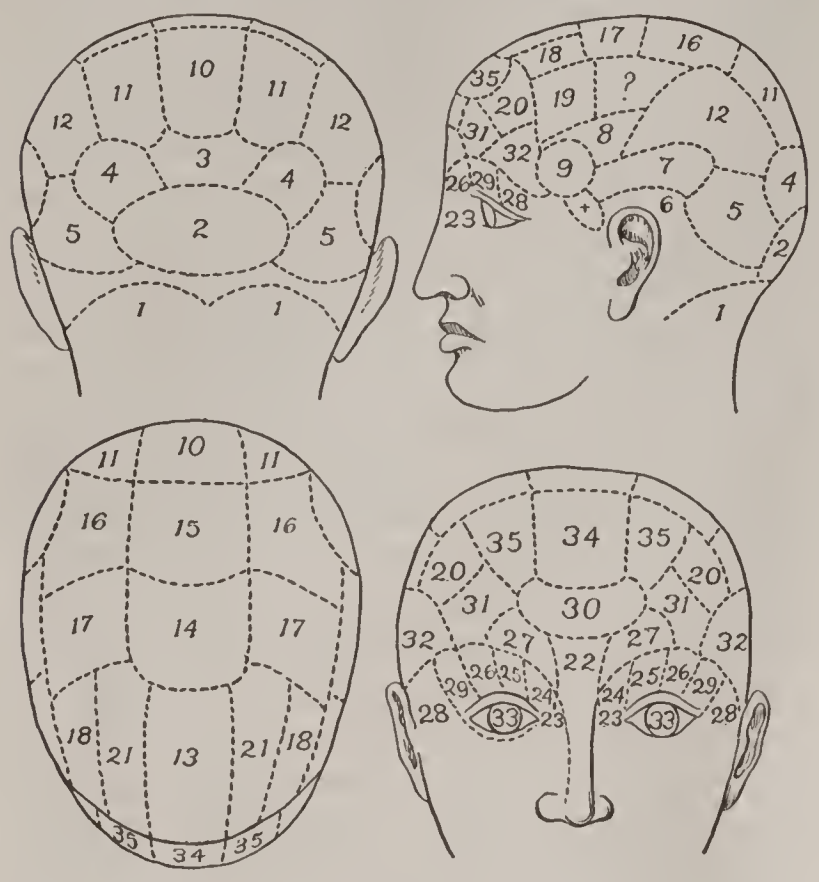
Photometers are instruments devised to make these comparisons. In simplest form, a photometer consists of a white paper screen with a grease spot in the middle, arranged on a sliding scale between two lights. When the screen has been moved until the light on each side is equally intense, the grease spot will be invisible. In this case the strengths of the two lights are proportional to the squares of their respective distances from the screen. An ordinary photometer appears in the illustration. Very delicate instruments which include a telescope and a polarizing apparatus are used to compare the light of the stars and other heavenly bodies.

PHRENOLOGY, *fre nol' o ji,* a so-called science quite modern in development, which grew out of a false interpretation of facts related to the progress of anatomy and physiology in the early nineteenth century. Its founder, F. J. Gall, represents the combination of a man of science, who was a notable contributor to the anatomy of the brain, and also an adherent of the impressionistic methods (such as Lavater used and may have suggested to him); this led him to assert as proved facts arbitrary associations of mental qualities with bodily characteristics. The system was popularized by Spurzheim, who came to America and there spread his doctrine with marked success. He died in Boston, and was given a public funeral attended by the President of Harvard College and other dignitaries.

While there are suggestions in classic and medieval lore of the association of parts of the head with mental functions (the front to judgment, the middle to imagination, the back to memory), phrenology took its start with the observations of Gall that men with certain prominences of the skull possessed definite qualities in marked degree. He observed the heads of students and related their proficiencies with their "bumps;" and thus located the "organ" of *number* in mathematicians, of *tune* in musicians; he observed the devout at church and located the "organ" of *reverence;* he observed poets and located the "organ" of *ideality;* he observed criminals and located the "organs" of *theft* and *murder;* he observed the insane and related their deficiencies to the poor development of intellectual parts of the skull.

When we read that "love of approbation" was large in a lunatic who thought herself the Queen of France; "acquisitiveness" was large in a pickpocket; "destructiveness" was large in a student fond of torturing animals (who became a surgeon), and in an apothecary who became an executioner; that "love of offspring" is located in the back of the head because that part is best developed in women and apes; that

"concentrativeness" was large in cats and in a clergyman fond of his home, we cannot but be amazed that such ridiculous conclusions could be seriously advanced in the nineteenth century and find so many followers that hundreds of



PHRENOLOGICAL CHARTS

Believers in this pseudo-science profess to find certain personal qualities related to the form of the head. While not endorsing such views, the following table is given as a key to the diagrams of the head, that the beliefs of phrenologists may be better understood.

AFFECTIVE

I.—PROPENSITIES

(1) Amativeness
(2) Philoprogenitiveness
(3) Inhabitiveness or Concentrativeness
(4) Adhesiveness
(5) Combativeness
(6) Destructiveness and Alimentiveness
(7) Secretiveness
(8) Acquisitiveness
(9) Constructiveness

II.—SENTIMENTS

(10) Self-esteem
(11) Love of Approbation
(12) Cautiousness
(13) Benevolence
(14) Veneration
(15) Firmness
(16) Conscientiousness
(17) Hope
(18) Wonder
(19) Ideality
(20) Wit
(21) Imitation

INTELLECTUAL

I.—PERCEPTIVE

(22) Individuality
(23) Form
(24) Size
(25) Weight
(26) Coloring
(27) Locality
(28) Number
(29) Order
(30) Eventuality
(31) Time
(32) Tune
(33) Language

II.—REFLECTIVE

(34) Comparison
(35) Causality

societies and a score of journals were founded to continue and practice this study. Prepossession and delusion could do no worse in the darkest ages of superstition.

It must be admitted that these illustrations are rather extreme, yet not as extravagant as the claims of practitioners who followed Spurzheim, and for a few dollars read character and predicted careers, and still do so. If we must consider these errors seriously, we may note that the division of the brain into such areas is absolutely arbitrary; that the assumption that shape of brain can be read minutely on the skull is false; that the so-called faculties are equally arbitrary and irrational. The whole system is a tissue of baseless assumptions founded upon a crude physiology and a cruder psychology.

The sciences of physiology and psychology have established that there is division of functions among the portions of the brain, but that this is in the general nature of sensory and motor areas, with "centers" for the prominent functions of correlation of impressions with impulses, such as writing, acts of skill, all of which involve intelligent conduct. To refer individual differences in these aptitudes to variable development of brain-tissue would involve a comprehensiveness of knowledge which we cannot remotely approximate. The actual knowledge of the nature of brain-function adds, if that be possible, to the utter irrelevance of phrenology, which thus remains the extreme as well as the latest example of pseudo-science. The readiness with which it found support was due to the persistence of the interest in "occult" forms of thinking and in ambitious attempts to guess the secrets of nature, as well as to the practical purpose of reading character and predicting careers. In this respect it conforms to the general history of the pseudo-sciences.

The subject should not be dismissed without emphasizing the supreme importance of the logic of science in establishing reliable conclusions, and the slow and difficult growth of knowledge upon which its progress depends. The pursuit of science requires a specialized training, a command of method and an objective interest. It is the subjective interest and the eagerness to apply hasty and unsupported conclusions that are responsible for the persistence of pseudo-scientific notions. It is not so much ignorance as the credulous habit of mind that is to be feared; to teach this lesson and train the mind in scientific thinking is an essential part of education. J.J.

Consult Hollander's *Scientific Phrenology;* Spurzheim's *Phrenology.*

Related Subjects. The following articles, while not bearing on phrenology, are of interest in this connection, because most of them deal with pseudo-sciences:

Alchemy
Astrology
Clairvoyance
Conjuring
Demonology
Divination
Faith Cure
Hypnotism
Magic
Medium

Mesmerism
Mind Reading
Necromancy
Occult
Palmistry
Physiognomy
Psychical Research
Psycho-Analysis
Spiritualism
Suggestion
Superstition
Telepathy
Theosophy
Trance
Witchcraft

PHRYGIA, *frij'i a,* in ancient times a country in the west-central part of Asia Minor. Eventually it became a part of the Roman Empire, and for governing purposes was divided, the northeastern portion becoming a part of the province of Galatia, and the western a part of the province of Asia. On the Phrygian plains large flocks of sheep were pastured, whose fleece was of the finest quality. Gold and marble were important products, and the culture of the vine was the occupation of large numbers of people. In *Acts* XVI, 6, Paul and a companion are recorded as preaching throughout "Phrygia and Galatia." In legend Phrygia was the home of Gordius and Midas (see Gordian Knot; Midas).

LOCATION MAP

Ancient Phrygia is shown in solid black. The surrounding provinces are identified below:

(*a*) Cappadocia (*f*) Greece
(*b*) Paphlagonia (*g*) Mysia
(*c*) Bithynia (*h*) Lydia
(*d*) Thrace (*i*) Caria
(*e*) Macedonia (*j*) Pisidia

PHYLLOXERA, *fil ok'se ra,* a variety of plant lice that attacks grape vines. This insect, a member of the aphid family, is native to North America, and has fed on wild vines of that continent for centuries, but its destructive powers were not fully realized until about the middle of the nineteenth century, when it was carried to Southern France upon native American vines. There its ravages caused the destruction of one-third of the vineyards; vine growers in other sections of Europe to which it spread also suffered enormous losses. The phylloxera attacks either the leaves or the roots of the vine, but it is the latter form of attack that causes the most serious injury. As nearly all American vines are more or less free from root attacks, and European vines suffer from them more than from leaf attacks, the ravages of the parasite are best prevented by grafting European varieties on American stocks. Smothering out the insects by inundating the vineyard with water and saturating the soil about the roots with carbon bisulphide are standard measures of combating the phylloxera. When the roots are attacked they become enlarged, then die and rot away. The leaves then turn yellowish, the vine ceases to grow, and in time the whole plant is destroyed. See Aphides; Grape.

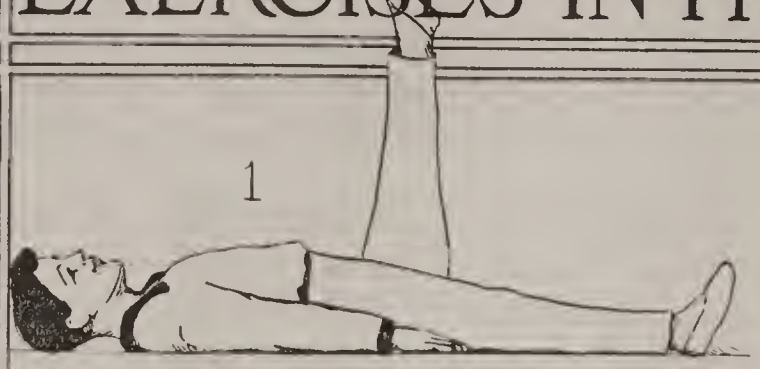
PHYSICAL, *fiz'i k'l,* **CULTURE.** The modern age is essentially a health-seeking age. This statement does not mean that there is a tendency to neglect the intellectual or spiritual life, but it has reference to the emphasis that is being placed on the development of man's physical forces. It is now being urged as never before that general care of the body, for the upbuilding and preservation of its health, is necessary if the world's work is to be done efficiently. Physical culture is one of several terms that have come to be applied to this development of the physical organism. The person who undertakes to apply its principles must know the value of exercise, pure air, ventilation, proper breathing and proper eating. In the subhead below, *Exercises for Health,* will be found helpful suggestions along the line of exercise.

Exercises for Health. Certain forms of gymnastics will build up one organ or muscle, while another kind of exercise will affect an entirely different set of muscles. Club swinging, for example, develops the muscles of the arms, wrists, back and shoulders; bending exercises develop the waist, hips and abdominal muscles, giving flexibility and grace to movement; running not only strengthens the leg muscles, but by forcing deep breathing brings about better chest expansion and lung development. It is this feature of *adaptability to individual needs* that makes gymnastics so helpful, for by consulting a trained instructor and faithfully pursuing the course of exercise prescribed, one can correct almost any defect in his physical organism.

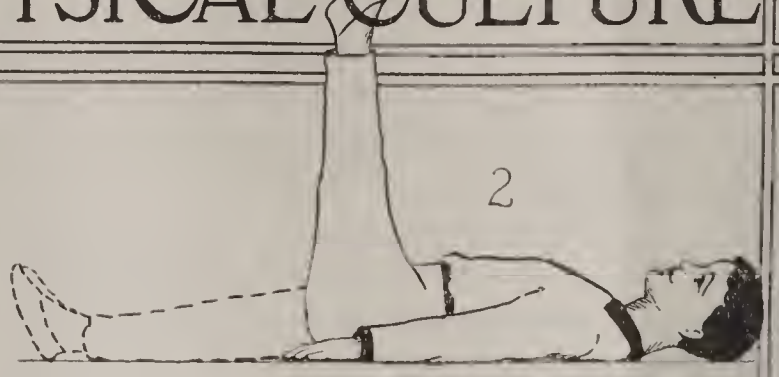
An important thing in all gymnastic work is to know where to stop. It is dangerous to carry any exercise so far that one part of the body is developed at the expense of the rest. At all times strain should be avoided, for excess brings about a reaction that produces a change exactly in the opposite direction. Moderate exercise tending toward good, all-round development of the body is the ideal for which to strive, rather than abnormal development in any one direction.

A large part of the benefit from gymnastics, aside from the muscular development, comes from the fact that the exertion makes it necessary to breathe harder and more deeply. For

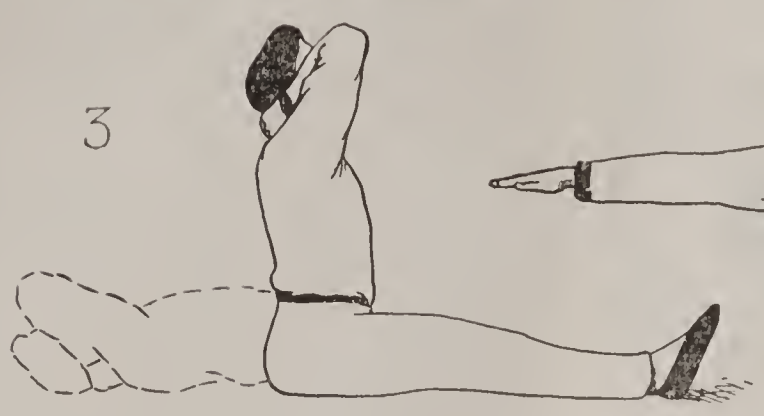
EXERCISES IN PHYSICAL CULTURE



1



2



3

4

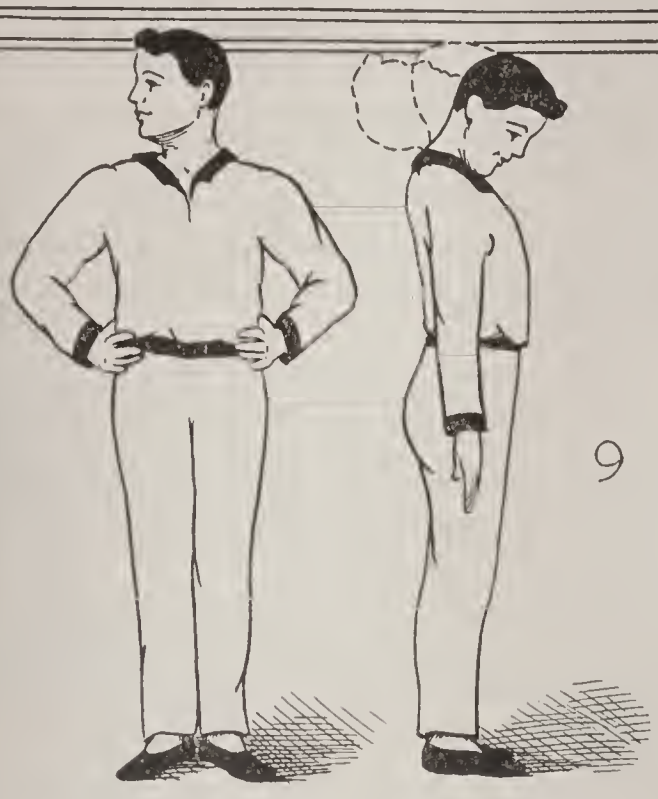
5

6

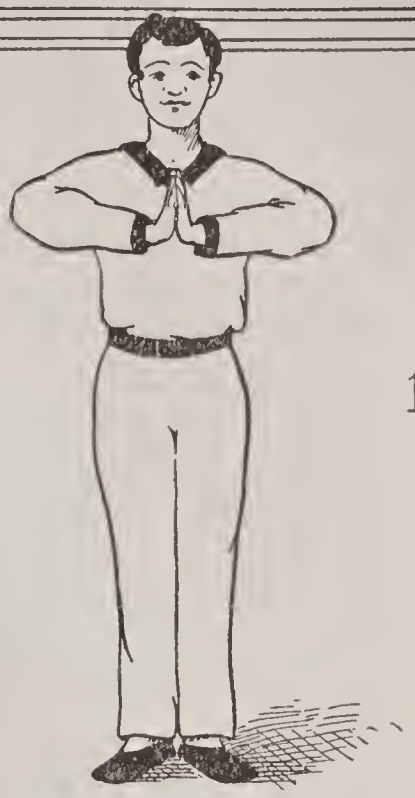
7

8

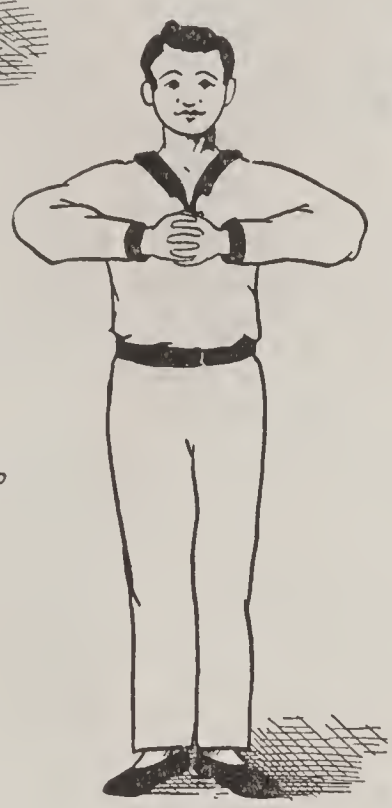
EXERCISES IN PHYSICAL CULTURE



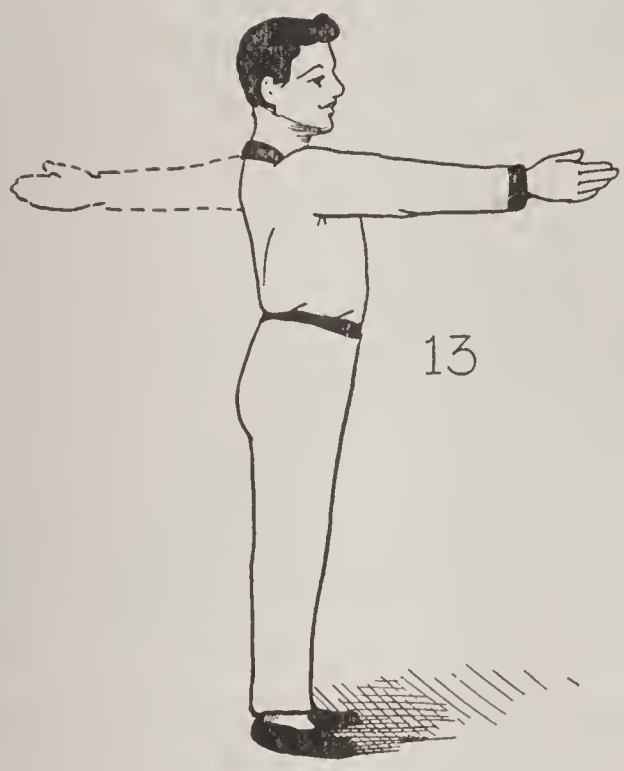
9



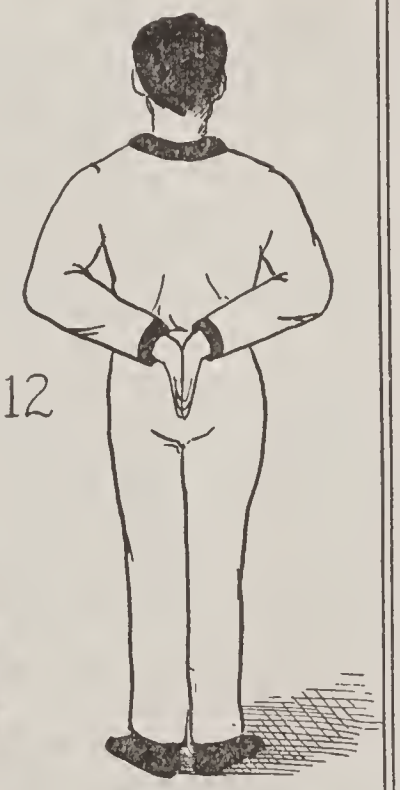
10



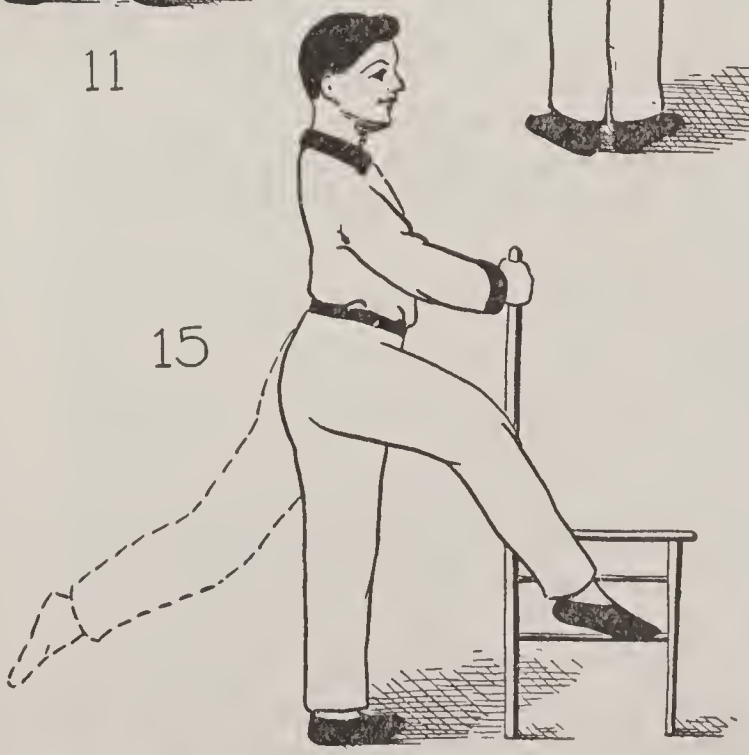
11



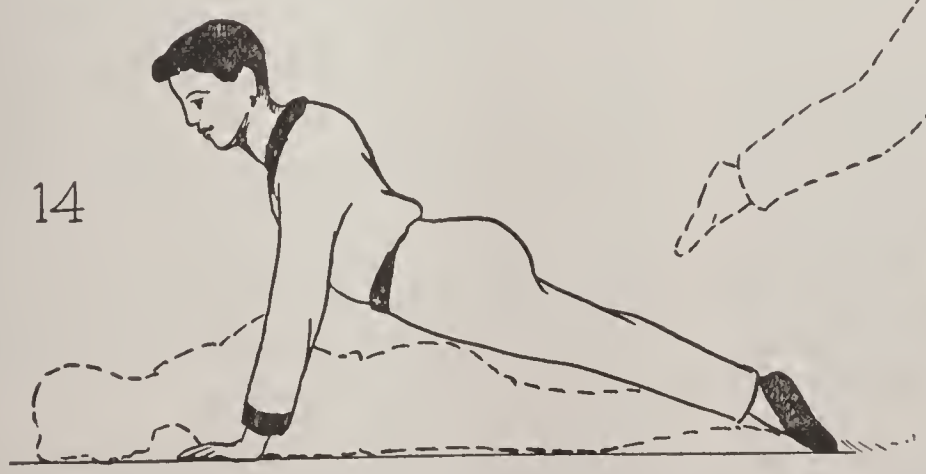
13



12



15



14

this reason the room in which gymnastic exercises are performed should invariably have its windows open to admit plenty of fresh air. Still better, of course, is to do the work out-of-doors. The exercise keeps forcing more air into the lungs than would ordinarily be inhaled. This air, if pure, vitalizes the heart and sends a healthful glow all through the body. The action of the stomach and other organs is stimulated; the appetite is toned up; the digestion is improved. These are all things that make for good health, and good health is the goal at which all gymnastic training should aim.

People make a mistake in assuming that special apparatus is necessary in order to benefit from gymnastics. The apparatus simply furnishes a different medium for doing the things which promote health; its purpose is to supply incentive and increase the interest. But in nearly every case the same results can be attained by performing the exercises without apparatus.

The following practice exercises will be found helpful to every person. They should be performed a certain number of times every day:

Exercise 1. Lie flat on the back. Raise first one leg and then the other to a perpendicular position. (See Figs. 1 and 2.)

Exercise 2. Raise and lower both legs. Continue until mildly tired. This is an excellent exercise for the abdominal muscles.

Exercise 3. Same position as in Exercise 1. Hands clasped behind the head. Pull up to sitting position. (See Fig. 3.)

Exercise 4. Stand erect, arms outstretched at the side horizontally. Twist to left as far as possible, then twist to the right. (See Fig. 4.)

Exercise 5. Hands on hips. Bend first to right as far as possible. Then repeat to the left. (See Fig. 5.)

Exercise 6. Stretch hands overhead. Bend back as far as possible, repeating until tired. Alternate by bending forward and trying to touch toes. (See Fig. 6.)

Exercise 7. Hands on hips. Twist the trunk around in a circle, first one way, then the other. (See Fig. 7.)

Exercise 8. Hands on hips. Lower the trunk to a squatting position and raise to standing. (See Fig. 8.)

Exercise 9. Tense the muscles of the neck and turn head from side to side, making one set of muscles resist the other in the movement. In the same manner turn the head forward and back and around in a circle, first to the left, then to the right. This is to develop and strengthen the neck. A large neck indicates power. It insures a good blood supply to the brain. (See Fig. 9.)

Exercise 10. Place the palms of the hands together in front of the breast and press hard. (See Fig. 10.)

Exercise 11. Lock the fingers together in front of the chest and pull one hand against the other. (See Fig. 11.)

Exercise 12. Lock the hands behind the back and alternately pull one against the other and push them together. (See Fig. 12.)

Exercise 13. Arms outstretched horizontally. Make the hands describe a full circle forward and back. (See Fig. 13.)

Exercise 14. Place the hands on the floor, the body outstretched, face downward. Raise and lower the body from the floor. (See Fig. 14.)

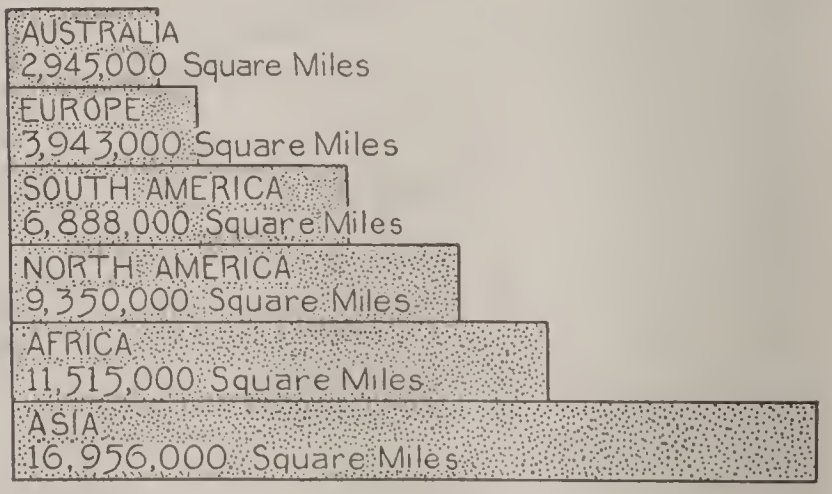
Exercise 15. Hands on back of a chair or table. Raise and lower the knees rapidly, as in running. (See Fig. 15.) B.M.W.

Consult Gulick's *Physical Education by Muscular Exercise;* Tyler's *Growth and Education.*

Related Subjects. Other phases of the general subject of physical culture are treated in the following articles in these volumes:

Amusements (with index)	Food
Athletics (with index)	Games and Plays
Breath and Breathing	Health (with index)
Calisthenics	Health Habits
Delsarte System	Hygiene
Education, subtitle *Hygiene of Education*	Nutrition
	Play

PHYS'ICAL GEOG'RAPHY. The word *geography* is a compound of two Greek words meaning *earth* and *to write;* the science of geography is, then, broadly speaking, the study of the earth. This is so vast a subject that



COMPARATIVE SIZES OF THE CONTINENTS

it has been divided into different departments, all of which are described briefly in these volumes in the article GEOGRAPHY. *Physical geography* is one of these divisions—the one which deals with the natural features of the earth and the changes in its appearance that have taken place and are continuing at the present time. It does not concern itself with political divisions nor does it take up the study of plant life or the investigation of the races of mankind, but it does show how the character of the earth's surface has affected the distribution of life, and what effect natural conditions have had on man's progress.

Physical geography treats first of the earth as a whole—its shape, size, movements, relation to other bodies in the solar system, and its

structure. The atmosphere, which envelopes the globe on all sides, is another division of this branch of geography. Included in this division is the study of the composition of the air, its pressure and elasticity, the effects of variations in temperature, the movements of the air, the seasons, zones, storms, rainfall, snow and kindred topics. The land and water envelopes of the earth are also studied in detail in physical geography. This science treats of the depth and area of the various ocean divisions, of the color, temperature and composition of ocean waters, of currents, tides and waves, of the contour and characteristics of the ocean floor, and of the formation of continental shelves. Seas and lakes are also studied. In taking up the land surface of the globe, one would study the character, location and formation of continents, plains, plateaus, mountains, rivers, valleys and islands. At all times, through the work of heat, atmosphere and running water, and through other agencies, the appearance of the earth is undergoing many changes. It is the province of physical geography to investigate and classify these forces of change and study their effects. It is one of the most fascinating of the sciences.

Consult Lake's *Physical Geography;* Abbott's *Water and Land;* Kingsley's *Madam How and Lady Why;* Mills' *Realm of Nature.*

Related Subjects. The scope of this branch of geography is indicated by the numerous topics directly related to it, and the reader is referred to the subhead *Physical Geography* in the list of related subjects following the article GEOGRAPHY (page 2431).

PHYSICS, *fiz'iks.* Boys and girls, if they are natural, are always asking questions, most of which begin with Why and How. So without knowing it they are students of physics, for, although this interesting science does not answer questions of all sorts, it does tell the why and the how of most of the things we see about us in our daily lives. The word *physics* is from the Greek word for *nature,* and formerly the science was called *natural philosophy.* It then included a number of subjects—chemistry, astronomy, geology and others—which are now treated as individual sciences. It still tells us about the forces of nature, about air and water, about light, heat and sound, about electricity and about how man has utilized his knowledge of all these to make his work easier.

Here are some of the questions that a boy or girl can answer after even a half year's study of the principles of physics:

Why is the end boy likely to be thrown when you play crack-the-whip?

Why will ink climb up into a piece of blotting paper?

Why does oil flow faster if you take the cap off the top of the can?

Why is a jerk more apt to break a string than a steady pull?

Why is it hard to open a door if you push near the hinged side?

What makes a ball bounce?

Does a piece of iron fall faster than a stick of wood?

Why do pieces of paper float upward from a bonfire?

Why do tall books tip over easily?

If a railroad train has smooth steel wheels and the track is smooth steel why do not the wheels spin around without moving the train?

Why is it easier to lift a stone under water than above it?

How does a fireless cooker work? A thermos bottle?

How is it possible to make artificial ice?

Could water in a pipe flow over a hill if the top of the hill were higher than the source of the water?

With two pieces of water pipe, one ten times the diameter of the other, how could you make a machine that would enable you to raise a weight of one thousand pounds with ease?

Why does a baseball thrown into the air travel in a curve?

Why does a door make a noise when it slams?

Why does a paddle look bent at the point where it enters the water?

What the Science Does for Us. An African explorer tells of climbing the snow-clad Ruwenzori Mountain, which is situated exactly at the equator, and taking as luggage bearers a number of unclad natives. When he camped for the night at a point several thousand feet above the sea, he gave to each man a heavy woolen sweater, but a few hours later he found the poor fellows huddled together, half-frozen and still naked, for they did not know that clothes would keep them warm. The story illustrates the fact that the human race is dependent upon its knowledge of physical laws for its simplest material comforts. But the advantage of physics does not stop with simple things. All of us have at one time or another tried to count the wonderful inventions that have been made since our fathers were young, and every invention we can name was the result either of the application of known laws of physics, or of the discovery of new ones. Thus no man could have made a phonograph without knowing what sound is, nor have built a trolley-car system without understanding the transmission of electricity. E.D.F.

Consult Hopkins's *Experimental Science;* Carhart and Chute's *First Principles of Physics;*

Milliken and Gale's *First Course in Physics* (Revised).

Related Subjects. The topics in these volumes relating to physics in some of its phases are very numerous. The reader is referred to the following:

Aberration
Attraction
Boiling Point
Boyle's Law
Calorie
Capillarity
Centrifugal Force
Centripetal Force
Cohesion
Composition of Forces
Compressed Air
Crookes Tubes
Dielectric
Diffraction
Diffusion
Ductility
Dynamics
Dynamo
Dyne
Echo
Elasticity
Electricity (with index)
Energy
Evaporation
Expansion
Extension
Falling Bodies
Flexibility
Fluorescence
Foot-Pound
Force
Freezing
Friction
Galvanic Battery
Geissler's Tubes
Gravitation
Gravity, Center of
Gravity, Specific
Hardness
Harmonics
Heat
Horse Power
Hydraulics
Hydrometer
Hydrostatics
Ice
Inclined Plane
Inertia
Kinematics
Lens
Lever
Leyden Jar
Light
Liquid
Liquid Air
Magnet and Magnetism
Magnetic Needle
Malleability
Matter
Mechanical Powers
Mechanics
Melting Point
Momentum
N-Rays
Parallelogram of Forces
Pendulum
Penumbra
Perpetual Motion
Photometry
Pneumatics
Polarization of Light
Porosity
Power
Pulley
Radio-Activity
Reflection
Regelation
Roentgen Rays
Shadows
Siphon
Solid
Sound
Spectrum Analysis
Spring
Statics
Steam
Steelyard
Temperature
Tenacity
Thermometer
Torsion Balance
Transformer
Vacuum
Vapor
Velocity
Water Power
Weight

The following eminent physicists are given special treatment in these volumes:

Arago, Dominique F.
Archimedes
Bacon, Roger
Bunsen, R. W. E.
Curie, Pierre and Marie
Edison, Thomas A.
Fahrenheit, Gabriel D.
Faraday, Michael
Foucault, Jean B. L.
Galvani, Luigi
Gay-Lussac, J. L.
Guyot, Arnold
Helmholtz, Hermann von
Herschel, Sir William
Kelvin, Baron
Michelson, Albert A.
Morse, Samuel F. B.
Newton, Sir Isaac
Roentgen, Wilhelm K.
Tesla, Nikola
Torricelli, Evangelista
Volta, Alessandro
Watt, James

PHYSIOGNOMY, *fiz i og' no mi,* a pseudo-science which attempted the specific task of reading traits of character in bodily signs. It became a pseudo-science by far overstepping the bounds within which such relations might be moderately suggestive. In the treatise on the subject attributed to Aristotle the essential doctrine is found. Such qualities as timidity, impudence, courage and anger are associated with color, hair, form of body, length of limb, gait, voice, etc. Persons with thick, bulbous noses are insensitive; those with sharp-tipped ones, irascible; those with slender, hooked noses, noble but grasping, etc. Animal analogies were common. A person with a nose like an eagle's beak was put down as having the qualities of an eagle, the one whose appearance suggested an owl was wise, and he who looked like a crow was pert.

Rash generalization, on the basis of weak analogy (and supported by a certain amount of shrewd observation), is all that underlies the system. It continued irregularly as part of "occult" lore and popular belief, and at times received additions and was affiliated with the current systems of interpretation. An astrological physiognomy was formed by associating each of the lines of the forehead with a planet and interpreting the depth and prominence of the line in terms of the moral quality associated with the planet. The notion persisted that animal qualities (the courage of the lion, the timidity of the deer or hare, the stupidity of the ass or sheep, the cunning of the fox, the farsightedness of the eagle) would be possessed by those whose heads and features suggested the one or other animal peculiarity; and some attempt was made to generalize such qualities; for example, long-haired creatures were courageous, and short-haired creatures were timid.

This body of doctrine, never very important, was revived by Lavater's sumptuous publications written in popular style and richly illustrated. Lavater relied purely upon his impressionistic sense; he noted prominent features among his friends and associated them with prominent qualities; he studied the faces of great men and proved to his own satisfaction that every feature of the head of Voltaire showed wit and satire. He associated certain shapes of brows, of nose, of mouth, of ear, of chin, with benevolence, cupidity, ambition, quick temper, firmness, etc., and made his analysis more and more detailed and refined. His descriptions were enthusiastic rhapsodies of

the qualities of the persons illustrated and of the nicety with which their features reveal their traits. No true verification was attempted; and his attempts to read the character of heads failed when the personality was unknown.

As practiced by Lavater, physiognomy becomes a convincing example of the worthlessness of generalizations founded upon a mere impression, and, still more, of the readiness with which a worthy enthusiast can deceive himself and make others believe that such unfounded conclusions rest on fact. Prepossession, delusion (i. e., unconsciously making the features fit the known qualities of the subject), along with a shrewdness in the interpretation of human nature which sympathetic experience brings—such is the basis of physiognomy. But in the hands of quacks physiognomy was mingled with all sorts of "occult" lore and fortune telling, and its distorted vestiges may be found in the cheap hand books that instruct the credulous how to read character and command fate.

The true scientific view of the meaning of features and expression began with the treatise of Sir Charles Bell (1806) and was markedly advanced by the work of Darwin (1872), who showed that the expressions of the emotions were associated serviceable habits, once really useful, and now refined miniatures, suggestive of their ancient service. Thus we sneer and raise the lip, while the dog snarls and shows his teeth as a threat. Naturally the tendency to assume certain types of expression, notably fear and anger, may give a set to the features. Stern, harsh expressions are contrasted with gentle and kindly ones. The human features, in terms of expression, contain a most interesting story; but the spirit of inquiry that led to their decipherment is wholly opposed to that which favored the pseudo-scientific notions of physiognomy. J.J.

Related Subjects. The following articles, while not bearing on physiognomy, are of interest in this connection, as many of them deal with various aspects of the pseudo-sciences:

Alchemy
Astrology
Clairvoyance
Conjuring
Divination
Faith Cure
Hypnotism
Magic
Medium
Mesmerism
Mind Reading
Necromancy
Occult
Palmistry
Phrenology
Psychical Research
Psycho-Analysis
Spiritualism
Suggestion
Superstition
Telepathy
Theosophy
Trance
Witchcraft

PHYSIOGRAPHY, *fiz i og' ra fi,* a term scientifically employed to cover the entire range of physical geography. It is explained under that title.

PHYSIOLOGY, *fiz i ol' o ji.* Human physiology treats of the processes and changes which take place during life in the tissues and organs of the human system. In the ordinary acceptance of the term physiology means the *science and art of preserving health.* Since a knowledge of the structure of the organs in the system is essential to an understanding of their functions, the study of physiology requires an investigation into the elementary facts of anatomy, and for this reason these subjects are usually studied together.

The statutes of all the states of the United States and of the provinces of Canada require physiology and hygiene to be taught in the public schools. Every person should have a knowledge of the elementary facts and principles of this science, for the following reasons:

1. Every one, for his own good, should possess such a knowledge of physiology as is necessary to lead him to live intelligently in accordance with the laws of health.

2. A community must rely upon a knowledge of physiology and hygiene of its members for the enactment and enforcement of such sanitary measures as are necessary to the public health.

3. A knowledge of the injurious effects of stimulants and narcotics; such information exerts a strong influence against their use.

The early history of physiology is obscure, but we know that for many centuries the practice of medicine was founded more upon tradition and superstition than upon scientific facts. Gradually, however, superstition gave place to scientific knowledge. Modern physiology began with the discovery of the circulation of the blood by William Harvey in 1628, since this discovery worked a revolution in most of the accepted theories then underlying medical practice. The next great discovery was that of the lymphatic system, in 1651. Since the discovery of the cell structure of tissues physiological science has made rapid advancement. This progress is recorded in the various articles relating to physiology.

Consult Gulick's *Hygiene Series;* Kellogg's *Animals and Man;* Cavanagh's *The Care of the Body;* Allen's *The Man Wonderful.*

Related Subjects. At the close of the article ANATOMY is given a list of the topics in these volumes which relate to physiology and anatomy. No attempt is made to separate physiological from anatomical topics, as the two subjects are very closely related. The reader is also referred to the articles DISEASE, MEDICINE AND DRUGS and

SURGERY, in connection with which will be found index lists of many topics more or less closely related to the general one of physiology.

PIANO, or **PIANOFORTE,** *pi an' o fort* (or *fohr' ta*), the most popular and also the most recently invented of musical instruments. In its present form the piano is only about two centuries old, but as a medium for the study of music it has more devotees than the voice and all the other instruments combined. Except in those rural districts where the reed organ is still the most common musical instrument, the piano is almost as usual an article of furniture as the bookcase and the library table. In mechanism, the piano is an instrument whose sounds are produced by the striking of small, felted hammers upon wire strings. These strings extend over bridges resting on a thin wooden sounding board. The hammers are put in motion by levers connected with keys. Other features of the mechanism are the *dampers,* which deaden the sound after the note is struck, and *pedals,* which when pressed down by the feet control the quality and intensity of the sound by moving the hammers or dampers.

The name *pianoforte,* applied to the instrument by its Italian inventor, Bartolommeo Cristofori (1709), is a compound of two words meaning *soft* and *loud.* The name was applied to the instrument to emphasize the difference between it and its immediate predecessor, the harpsichord (which see). In the latter there was no means of modifying the loudness of the notes. The fundamental principles of the modern grand piano, in which the strings lie in the direction of the keys, were embodied in Cristofori's instruments, but there have been developed many improvements and various devices to improve the quality of the tones. Pedals were the invention of an English piano maker named Broadwood (1783), and the first upright piano, in which the strings are stretched perpendicularly to the keys, was the invention of another Englishman, John Isaac Hawkins (1800). Other names famous in the development of the piano are those of Silbermann, Stein and Erard, all of whom were Germans.

Player Piano, a playing mechanism attached to the piano, which by means of perforated sheets automatically presents a variety of composition—ranging from popular melodies to the masterpieces of the great composers. The special rolls are records of actual piano playing by professionals. However, the instrument is not merely a reproducing piano; it can be adapted readily to the direct expression of the individual performer's ideas, by means of many expression devices and control levers. Although the interior mechanisms of different player pianos vary in constructional detail, the underlying principles are about the same. With the exception of the piano keys at the extreme ends of the keyboard, a small hammer is placed opposite each piano key. These hammers are worked by air pressure produced by a bellows system, the "power plant" of the instrument, operated by an electric motor or by pedal movement. The action of each hammer depends upon the suction of air into its tiny compartment, and the suction is regulated by the passage of the perforated sheet over a row of tiny openings. When the selection is finished, the roll is automatically rewound.

Consult Krehbeil's *The Pianoforte and Its Music;* Van Atta's *Treatise on the Piano and Piano-Player.*

PIASTER, *pi as' ter,* a name for the Spanish dollar, called more recently and less poetically the peso. The "pieces of eight" which the pirates of the "Spanish main" are supposed to have buried, and with the discovery of which historical romancers ever since have busied themselves, were the eight-*real* pieces, or piasters. The name is no longer used in Spain, but to-day is applied to the monetary unit of Turkey, a silver coin worth but four and one-half cents in United States and Canadian money. This coin, which is also in use in Egypt, the Turks themselves call the *ghurush.* See PESO.

PICCOLO, *pik' o lo,* a small flute having a pitch an octave higher than that of the ordinary concert flute (see FLUTE). The music of the piccolo, however, is written an octave lower than the notes are sounded, for convenience of

THE PICCOLO

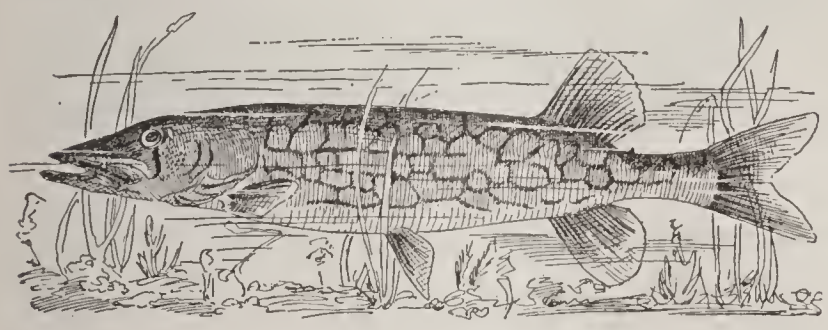
composition. The orchestral effects of imitating the whistling of the wind or the rustling of the leaves are admirably produced by the instrument, which is generally in the key of D. An organ stop, the tone of which resembles the sound of this small flute, is also known as piccolo.

PICKENS, *pik' enz,* ANDREW (1739-1817), an American military leader, whose service in the Revolutionary War was marked by a series of brilliant victories. He was born at Paxton,

Pa., and removed to South Carolina in 1752. He fought for several years in the wars against the Creek and Cherokee Indians, and at the beginning of the Revolutionary War he was made a brigadier-general of the South Carolina militia. With 400 men he won the victory at Kettle Creek in 1779; at Cowpens, in 1781, he rallied the forces after the ranks had been broken, and he captured the British forts at Augusta, Ga., in the same year. He fought with distinction at Eutaw Springs. From 1783 until 1794, and again from 1801 to 1812, Pickens was a member of the South Carolina legislature, after which he retired to private life.

PICKENS, Francis Wilkinson (1805-1869), an American statesman and diplomat who was conspicuous in the secession movement. He demanded the surrender of Fort Sumter, and erected the batteries which caused its reduction. He was born in Togadoo, South Carolina, was educated at South Carolina College, admitted to the bar in 1829 and elected to the state legislature in 1832. He served Congress from 1834 to 1843 and there upheld nullification (which see); was United States minister to Russia from 1858 to 1860, being elected governor of South Carolina in the latter year. In 1862 he retired from public life. He was an extreme advocate of states' rights (which see).

PICKEREL, *pik'er el,* the name applied to several smaller species of the pike family. Like the true pikes, they have large mouths and voracious appetites, and are stubborn fighters when caught with a hook. All are fresh-



THE PICKEREL

water fish, and a distinguishing feature is the presence of scales on the cheeks. The three best-known species of North America are the *banded* pickerel, occurring east of the Alleghanies from Massachusetts to Florida; the *little* pickerel, found abundantly in the Mississippi Valley; and the common *eastern* pickerel, which is a habitant of lakes and streams east and south of the Alleghanies, from Maine to Florida and west to Arkansas. The banded and little pickerels, which are not more than a foot in length, are too small to be important food or game fishes, but the eastern pickerel is much sought by anglers. In some parts of its range it attains a length of three feet. In color it is greenish, and the body is marked by a network of fine, dark lines. Its flesh is firm and agreeable in flavor, though somewhat dry. The name is frequently applied to the common pike. See Pike.

PICKETT, *pik'et,* George Edward (1825-1875), the Confederate general who led "Pickett's charge" on Cemetery Hill at the Battle of Gettysburg. The hill was the key to General Meade's position. Under an extremely severe fire Pickett's division stormed the hill and succeeded in entering the enemy's lines, but, left without support, they were compelled to fall back, broken and almost annihilated. This charge is said to have been the most brilliant feat of arms performed on any Confederate field.

General Pickett was born at Richmond. After graduating from West Point, he served in the Mexican War as a lieutenant, and later fought on the Western frontier against the Indians. When the War of Secession broke out he resigned from the United States army to become colonel of the state forces of Virginia. After the Peninsular Campaign, during which his division gained renown as the "game-cock brigade," he was made a major-general. Toward the close of the war he rendered brilliant service in the defense of Petersburg. After peace was declared he returned to Richmond, where he engaged in business for several years. See Gettysburg, Battle of.

PICKLES, *pik'l'z,* fruits and vegetables preserved in vinegar and served as food, the especial purpose of which is to stimulate the appetite and to add spiciness and flavor to the dinner. Vegetable pickles are made chiefly from cauliflower, cucumbers, tomatoes, gherkins, onions, mushrooms and nasturtiums (seed pods and flower buds). There are innumerable variations in preparing the different pickles, but the standard method of making the popular unripe cucumber pickles (gherkins) is a good type. The recipe for making a peck of these pickles calls for a quart of pickling onions. The gherkins are first of all cleaned very carefully. They are then placed in brine with the peeled onions and allowed to stand for twenty-four hours, after which the mixture is drained and the pickles are packed in clean jars, chopped red and green peppers having been added.

Vinegar (two cupfuls of pure cider vinegar to each quart of pickles), brown sugar and spices (cloves, allspice, mustard, cinnamon)

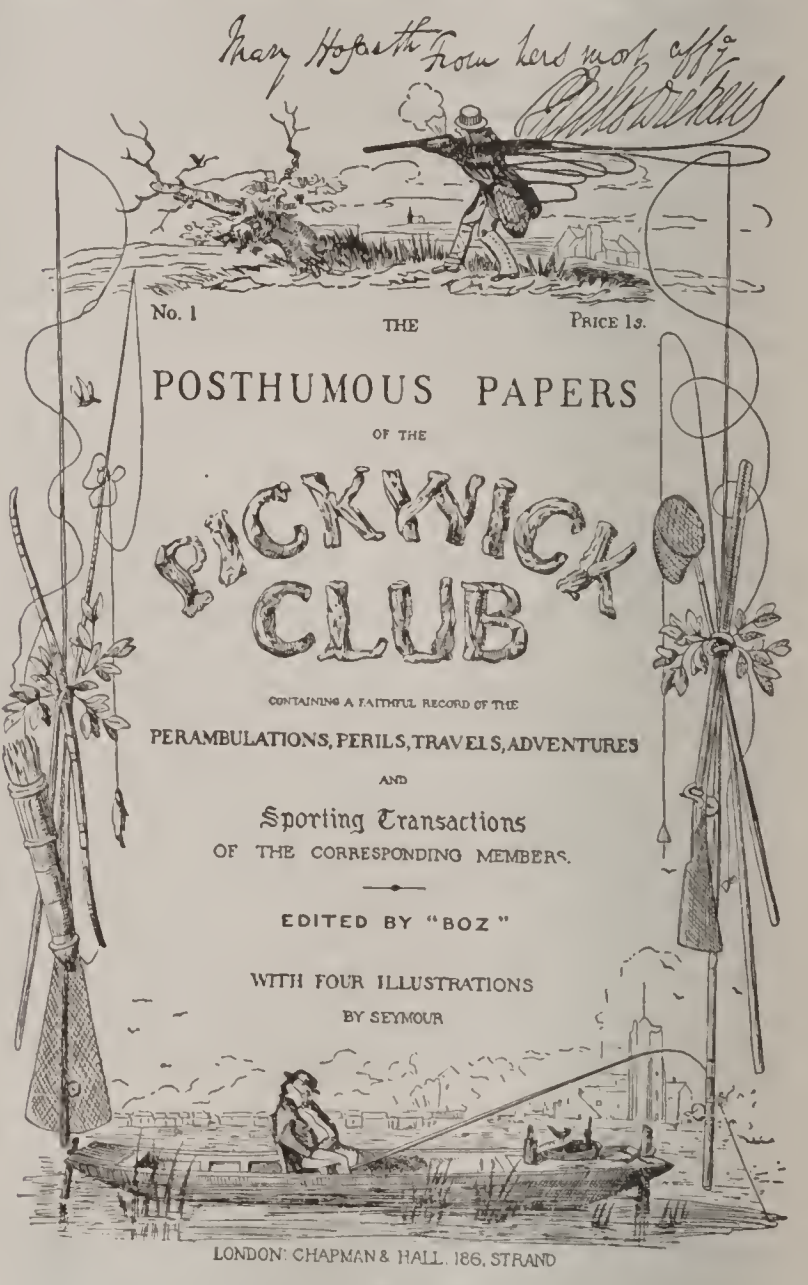
are placed in a saucepan and boiled for five minutes, and the resulting liquid is poured hot over the pickles. Before the jars are sealed and put away the pickles must be left in a warm place for twenty-four hours, hot vinegar being added now and then to make up for shrinkage. If the vegetables used are naturally soft, cold vinegar is preferred by some, as hot vinegar tends to soften the pickle. After the jars are sealed it is a good idea to let the pickles stand for two months before serving them.

The careful housewife and the honest manufacturer will take pains not to use vessels made of metal, either in making or storing pickles, for the brine and vinegar are liable to form a poisonous deposit by corroding on the metal, and thus injure the pickle. Boiling vinegar in copper vessels causes a green salt to form, a poisonous substance which colors the pickles green. Unscrupulous dealers sometimes purposely color their product in this way. A harmless though somewhat difficult method of coloring the pickles green consists in steeping vine, cabbage, spinach or parsley leaves in the vinegar.

Indian pickle, or piccalilli, is a popular relish consisting of a mixture of pickled cucumbers, onions, cauliflower and spices, the vegetables being finely chopped. Chowchow, similar to it, consists of tomatoes, onions, green peppers, cinnamon, allspice, cloves, peppercorn, mustard, salt and horseradish. The popular dill pickle is a cucumber pickle flavored with the herb known as dill. Excellent sweet pickles are made from cherries, plums, peaches, pears, apples and grapes, and from many vegetables. The sugar used in making sweet pickles causes them to have a duller shade of green than the sour ones.

Pickles are excellent for relieving the monotony of a meal and for making more palatable any insipid foods that may be served, but it is worthy of emphasis that they must be eaten in great moderation, for they are not easy to digest. A pickle, however, is more digestible than the raw vegetable from which it is made, for vinegar tends to dissolve meat and vegetable fibers. Pickles contain a high per cent of water and a low per cent of protein, fat and carbohydrates, and are stimulating rather than nutritive (see Food, subhead *Chemistry of Foods*). B.M.W.

PICKWICK, *pik'wik,* **PAPERS,** or more correctly, *The Posthumous Papers of the Pickwick Club,* a story by Charles Dickens, published serially in 1836-1837. With the exception of the brief *Sketches by Boz,* it was Dickens' first work, and it is in some ways his best. It attempts to tell no real story, and the original idea of a club on its travels becomes but a thread connecting scores of incidents, grotesque, dramatic and pathetic. In no other work is Dickens' humor so free and so riotous. Sam Weller, Tony Weller, with his marital difficulties, Mrs. Bardell and her friends, Sergeant



THE TITLE-PAGE

The illustration is drawn from the title-page of the original edition. On it appears the author's autograph, which he wrote for his sister-in-law, to whom the book was given.

Buzfuz, the fat boy, are but a few of the characters who are a permanent source of amusement to all who have once made their acquaintance. Perhaps there is no other character in all of Dickens so well known as Sam Weller, whose appearance in the fifth number raised the *Papers* from comparative failure to such popularity as no story before published in England had ever attained. See Dickens, Charles.

PICRIC, *pik'rik,* **ACID,** a substance formed by combining carbolic acid and sulphuric acid and adding nitric acid slowly to the mixture. It appears in the form of yellow crystals. Pic-

ric acid colors the skin and animal fibers yellow, but as it will not color vegetable fibers it is a good test for fabrics suspected of containing cotton. Formerly it was used in dyeing silk yellow, but for that purpose it is now replaced by vegetable dyes. Its most extensive use is in the manufacture of explosives (which see).

PICTON, *pik'ton,* a town in Ontario, the county town of Prince Edward County. It is prettily situated on the Bay of Quinte, and has a harbor large enough to accommodate lake boats. It is on the Canadian Northern Railway, forty-two miles by rail southeast of Belleville, eighty-five miles southwest of Kingston and 141 miles east of Toronto. Picton's chief industrial establishments are canning factories, and it also has a creamery, boat yard and machine shop. It is the "hub" of Prince Edward County, which has fifteen or sixteen canneries and cans as many vegetables as all the rest of Ontario together. Since 1914 it has had a government armory. Picton was named for Sir Thomas Picton (1758-1815), a British general, who was one of Wellington's division commanders in the Peninsular campaigns and was killed at Waterloo. Population in 1911, 3,564; in 1921, 3,356. F.N.

PICTOU, *pik too',* the county town of Pictou County, Nova Scotia. It is on the north coast of the Nova Scotia peninsula, on Northumberland Strait and on the Intercolonial Railway. It is 116 miles by rail northeast of Halifax, and fifty-four miles northeast of Truro. Steamers run between Pictou, Charlottetown, Montreal and ports on Cape Breton Island. Population in 1911, 3,179; in 1921, 2,988.

Pictou is well known as a seaside resort and also as a shipping point for New Glasgow (which see). Among its industries are flour-milling, woodworking, and the manufacture of biscuits, candy, tobacco products and motor boats. It is also noted as the seat of Pictou Academy, founded in 1818. From this school have been graduated many of Canada's most famous men, including Sir Adams Archibald, Sir John William Dawson, Rev. Daniel M. Gordon and Rev. George Monro Grant.

PICTS, *pikts,* an ancient people of Great Britain whose modern descendants are represented by some of the inhabitants of Southern Wales and Western Ireland. Nothing certain is known of their origin. The name, from the Latin *pingo,* meaning *to paint,* was given them by the Romans because of their custom of staining or tattooing their skins. The first historical reference to them occurs in a speech made by a Roman orator in A.D. 297. For years the Picts carried on warfare with the Romans and the Teutonic invaders of Britain, the Angles and Saxons. About the eighth century they disappeared as a separate race.

PIDGIN, *pij'in,* or **PIGEON, ENGLISH,** the name given to a curious language much used in the seaports of China and the Straits Settlements. The term *pidgin* is a Chinese corruption of the word *business,* and indicates the purpose of the language, which has grown up as a means of communication between foreigners and the natives with whom they have business dealings. Corrupted English words form the basis, and intermingled with these are Portuguese, Chinese and Malay words, also corrupted; and the whole follows Chinese idiomatic usage in the arrangement.

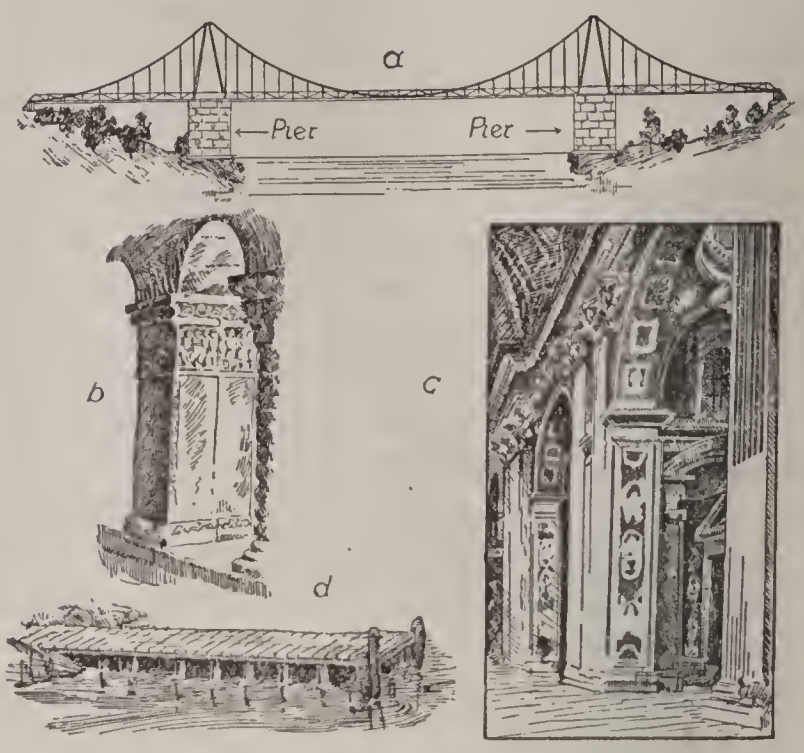
One peculiarity of the pidgin English is the frequency with which the ending *ee* occurs on the words borrowed from English; the Chinaman in America says not *wash,* but *washee;* not *suppose,* but *s'posee.* This is because, to the Chinaman, certain consonant sounds are impossible of pronunciation unless they are followed by a vowel sound. The sound of *r,* too, unless it is followed by another consonant, is very difficult for the Chinaman to produce, and he consequently substitutes *l* in such words as *plice* (price), *Melican* (American), or *cly* (cry). Some of the non-English words most commonly used are *savey,* for *know; chop-chop* for *hurry up; chow-chow,* for *food.*

PIEDMONT, *peed'mont,* a beautiful and fertile section in the northern part of Italy, now comprising a territorial department of that country. Switzerland adjoins it on the north, France lies to the west, and the Italian departments of Liguria and Lombardy bound it on the south and east. Piedmont is the upper valley of the Po River. Its name, meaning *foot of the mountain,* refers to its situation at the base of the high Alpine ranges that enclose it on all sides except on the south. It is 11,331 square miles in area, has a population of 3,424,450 (census of 1911) and consists of the four provinces of Alessandria, Cuneo, Novara and Torino (Turin). In this fertile region agriculture is an important industry, and considerable manufacturing is carried on in the towns and cities. Piedmont was formerly a part of the Sardinian kingdom (see SARDINIA, KINGDOM OF).

PIEDMONT REGION, a considerable region of broken and hilly land stretching east and southeast of the Appalachian Mountain chain,

in North America. It lies between the mountains and the coastal plain proper (see COASTAL PLAIN), the division from the plain being sharply marked by what is known as the *fall line* (which see). Along this line, streams from the west leave the harder, rocky ground adjacent to the mountains and cross the softer, more easily trenched coastal plain. The portion of the Piedmont plateau lying in New England is broad but less sharply marked off from the coastal plain than the hilly region farther south. It reaches its greatest breadth in North Carolina, where it extends 300 miles from the mountains. The underlying rocks were once worn away almost to a plain by erosion, but were lifted in a later upheaval. In places the Piedmont region is very fertile. In Virginia, especially, it is well adapted to the raising of apples.

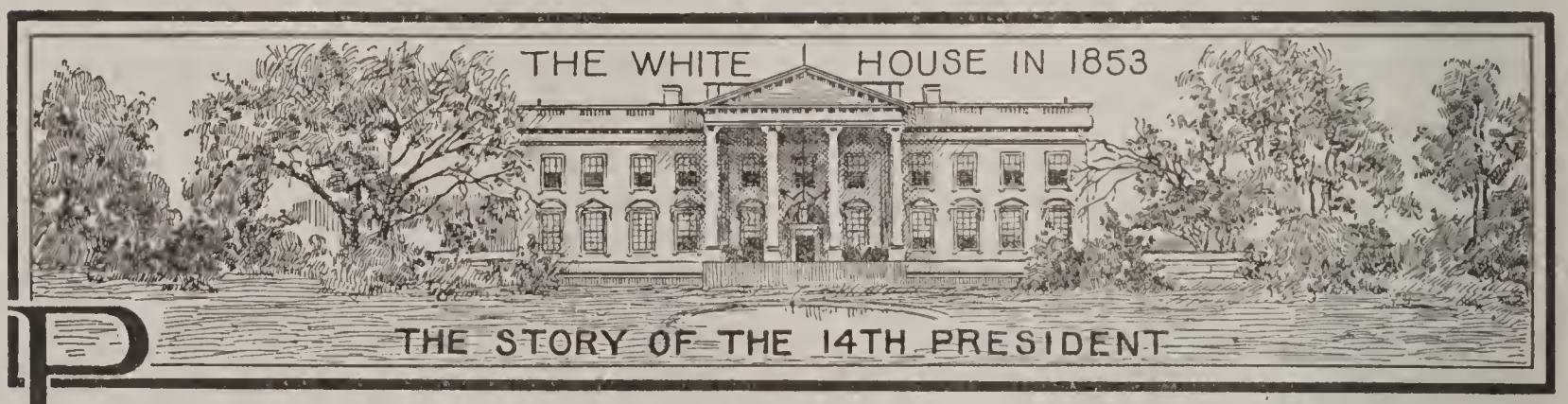
PIER, a pillar or post supporting a heavy weight, such as the end of a span of a bridge, or the end of an arch or lintel. The term is at present generally applied to the heavy masonry supports of a bridge. It may also mean a construction of covered piles extending from land out into the waters of a bay or harbor, for the purpose of forming a breakwater or a landing place for boats. A bit of thickened wall between two large openings becomes a pier because of the support it gives.



FOUR PIERS

(*a*) The foundations of great bridges; (*b*) pier in cloister of Sainte Elne, near Perpignan, France; (*c*) pier in the interior of Saint Peter's, Rome; (*d*) the pier, used as a boat landing.

In buildings, the pier has developed into the column, with base, shaft and capital. See COLUMN.



THE STORY OF THE 14TH PRESIDENT

PIERCE, *peerce,* FRANKLIN (1804-1869), an American statesman, fourteenth President of the United States. Frank Pierce, as his friends always called him, was a genial, handsome man, and a man of character and ability. In political matters he cannot be called great. There were many among his contemporaries who must be ranked higher than he—men like Douglas, Cass, and even Marcy. Yet if he was not a far-sighted statesman, he was at least energetic and capable, and he had the gift of selecting able men as his aids. Like most Presidents who have been chosen as the result of compromises, Pierce was himself a compromiser. He wanted to preserve the Union, and to accomplish that purpose he thought it necessary to placate the South. He was a Northerner, with Southern opinions.

In dealing with foreign nations, and particularly with England, he was less willing to compromise; indeed, his Presidency is noteworthy for its vigorous diplomatic history, and for its sure, sometimes overassertive insistence on American rights. Some of the responsibility for this foreign policy belongs to William L. Marcy, Pierce's Secretary of State, but there is no question that much belongs to the President. Pierce made grave mistakes during his four years in office, but they were mistakes which sprang from a kindly, sympathetic nature. Altogether, though not a great statesman, Pierce was personally one of the most attractive men who have ever guided the destinies of the United States.

Franklin Pierce was born at Hillsborough, N. H., on November 23, 1804. His father, Gen-

eral Benjamin Pierce, won his military title in the Revolutionary War, and later served two terms as governor of New Hampshire. As a boy and young man, Franklin had all the advantages which come to the son of a distinguished parent. At Bowdoin College, which he entered in 1820, he became most intimate with Nathaniel Hawthorne, and in his circle of friends were the poet Longfellow and John P. Hale. Many years later Hale was Pierce's colleague as United States Senator from New Hampshire, and in 1852 was a rival candidate for the Presidency. After graduating from college in 1824, Pierce began the study of law in the office of Levi Woodbury (1789-1851), who was at that time governor of New Hampshire, and was later United States Senator, a member of Jackson's and Van Buren's Cabinets, and finally Associate Justice of the United States Supreme Court.

His Political Career. Pierce was admitted to the bar in 1827, but two years later abandoned the law for public life. This was a natural step for an ambitious young man who had been since boyhood in continuous association with public men. His first office was that of representative in the state legislature. He was reëlected three times, and during two terms served as speaker of the house, an unusual honor for a man under thirty years of age.

Pierce was just twenty-eight years old when the Democrats nominated and elected him to the United States House of Representatives. There he served until his election to the Senate in 1837. When he took his seat he had the distinction of being the youngest member of that body. He became a vigorous supporter of the policies laid down by President Jackson and followed by President Van Buren. He opposed the renewal of the charter for the Bank of the United States, voted against appropriations for the Military Academy at West Point, and on every occasion fought appropriations for internal improvements. It is interesting to note, however, that he did not approve the spoils system, which was advocated both by Jackson and by Van Buren. In Congress at this time were the political giants, Benton, Webster, Clay and Calhoun, who somewhat overshadowed Pierce, but the latter was nevertheless missed after 1842, when he resigned from the Senate and resumed the practice of law.

During the next five years Pierce had one opportunity after another to reënter political life, but again and again he stated his intention never again to hold public office. The governor of New Hampshire offered him an appointment to the Senate to fill a vacancy; the Democrats of the state urged him to accept the nomination for governor, and President Polk tendered him the Attorney-Generalship of the United States. But Pierce declined each offer in turn. He did not, however, cease to take an interest in politics, and was consulted by Democratic leaders on questions of party policy. He even took the

FRANKLIN PIERCE

The third of four Presidents of the United States who were born in New England. The Adamses, father and son, were sturdy New England types; Arthur, the fourth, is rated as a son of New York, for most of his life was spent in that state.

stump against John P. Hale, his friend and college mate, in the famous campaign known as "the Hale storm of 1845."

Hale was a Democratic Representative from New Hampshire who had won prominence by his opposition to "gag rule." He was renominated by the state convention in 1844, but when the state legislature resolved that the New Hampshire members of Congress should vote for the annexation of Texas, he issued a statement opposing annexation on antislavery grounds. The convention was hastily reassembled, Hale was declared a traitor to his party, and his name was taken off the ticket. He then ran as an independent, but neither he nor the Whig candidate received a majority of the votes cast. Then Hale carried on a whirlwind campaign to win New Hampshire to the antislavery cause, and in the face of a powerful

Democratic majority, headed by Pierce, succeeded in obtaining a legislature in which the Whigs and antislavery Democrats had a majority. In this contest Pierce clearly revealed the fact that he was "a Northern statesman with Southern principles."

At the outbreak of the Mexican War, Pierce volunteered as a private soldier. Before long, however, President Polk commissioned him a colonel, and in March, 1847, appointed him brigadier-general of volunteers. Pierce promptly sailed for Vera Cruz, where he joined General Winfield Scott in time to take part in the battles of Contreras and Churubusco. At Contreras Pierce was thrown from his horse, but, although suffering great pain, refused to leave the field. This brief military experience, although creditable, added little to his reputation. He was essentially a peaceable man, and was never associated in the public mind with military affairs.

Presidential Candidate. During the four years following the Mexican War, Pierce practiced law at Concord, N. H. Except for a single instance, in 1850, when he was president of a convention to draft a new constitution for New Hampshire, he had no part in public affairs. This aloofness from the issues of the day made Pierce an acceptable compromise candidate for the Presidency in 1852. The Democratic convention met at Baltimore on June 1. To the previous party declarations on the subject of slavery its platform added a new resolution, pledging the party to a faithful execution of the Compromise of 1850, "the act for reclaiming fugitive slaves included," and to a resistance of all attempts to renew agitation of the slavery question. Then the convention struggled fruitlessly for three days to nominate; Cass, Marcy, Buchanan and Douglas were formidable candidates. On the thirty-fifth ballot General Pierce received a few votes, and on the forty-ninth ballot he was nominated. It cannot be said that Pierce was a national leader, but he held a respectable place in public life, was personally attractive and was popular; he had no record to attack and no enemies to fear. Less able than any of the men he defeated, he was a safe selection under the existing conditions.

To oppose him the Whigs nominated General Winfield Scott, on a platform almost identical with that of the Democrats, recognizing the "finality" of the Compromise of 1850. Some of the Southern Whigs refused to support Scott because of his lukewarm attitude towards the Compromise. The Free-Soilers thereupon held a convention of their own, and nominated for President John P. Hale, Pierce's old college friend and political opponent. Between Pierce and Scott there was no real issue except the personality of the candidates, and the campaign soon degenerated into petty personalities. Scott was called a "miracle of vanity," and Pierce was unjustly abused as a coward in the Mexican War and a drunkard in private life. There was no enthusiasm for Scott, and the result was foreseen for weeks. Pierce carried every state except Massachusetts, Vermont, Kentucky and Tennessee, and received 254 electoral votes to 42 for Scott.

The Administration of Franklin Pierce, 1853-1857

Pierce was inaugurated "in the full sunshine of popularity," and delivered an optimistic inaugural address before the largest assembly which had ever gathered in Washington on such an occasion. In selecting his Cabinet, Pierce showed the same optimism, and as a means of maintaining compromise, chose men of all factions. William L. Marcy, Secretary of State, was a leader of the New York state "Hunkers," or conservative Democrats. James Guthrie, Secretary of the Treasury, and James C. Dobbin, Secretary of the Navy, were conservative Southern Democrats. But on the radical side were Robert McClelland, Secretary of the Interior, an antislavery Northerner; Jefferson Davis, Secretary of War, a states'-rights Southerner; and Caleb Cushing, Attorney-General, originally a Massachusetts Whig. Although composed of so many elements, this Cabinet remained unchanged throughout the whole of Pierce's administration, a unique distinction in the history of the United States.

The Kansas-Nebraska Bill. In spite of the fact that the platforms both of the Whigs and of the Democrats accepted the finality of the Compromise of 1850, the slavery question came to the front in less than a year after Pierce's inauguration. In January, 1854, Stephen A. Douglas introduced into the Senate the Kansas-Nebraska Bill (which see). The bill passed at once, and became a law on May 30. Thus Congress repealed the Missouri Compromise of 1820, and left the new territories free to decide for themselves whether they would or would not admit slavery. Kansas, the territory nearest the newer states, was turned into a battle

ground, into which proslavery and antislavery men were poured by hundreds. The history of Kansas (which see) during this period is a record of civil war. Organized mobs took possession of polling places and carried elections.

ELECTION MAP, 1852

The states shown in black chose Democratic (Pierce) electors; those shaded were Whig, and voted for Scott. The white area was unorganized territory.

Lawrence and Osawatomie, the two chief antislavery settlements, were raided and sacked, and legislatures were dispersed by force. There were, in fact, two rival state governments, one proslavery, the other antislavery.

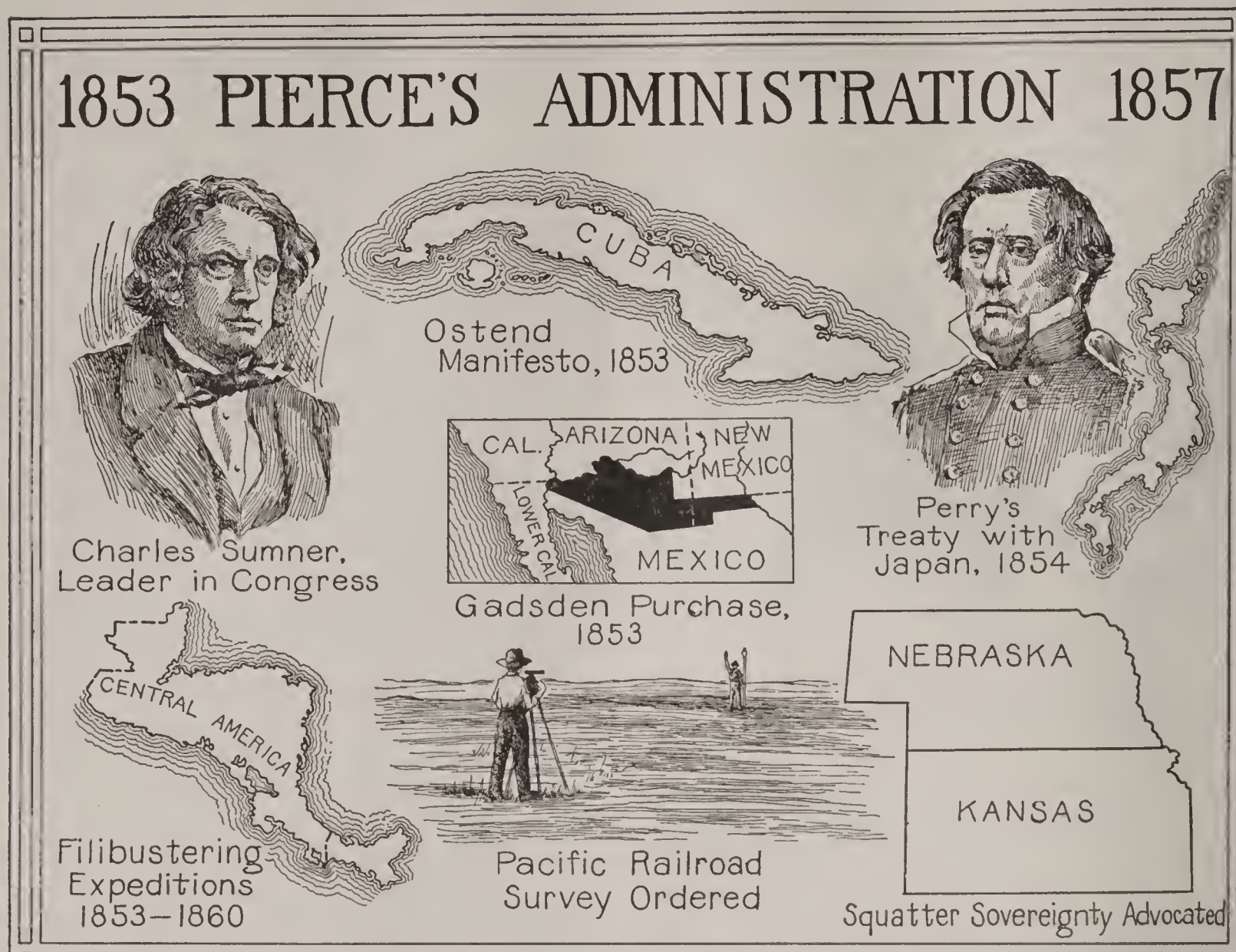
Few acts more fateful in character than the Kansas-Nebraska Bill ever passed the Congress of the United States, for it set in motion the train of circumstances which led inevitably to the War of Secession. It was the direct cause of a radical change in political sentiment in the North. It brought about the complete failure of the compromising policy of which Pierce himself was in favor, and, lastly, it destroyed the old national political parties. For this sudden, reckless disturbance Pierce has been severely criticized. In his first annual message to Congress he congratulated the country on its calm, adding, "That this repose is to suffer no shock during my official term if I have the power to avert it, those who placed me here may be assured." A farsighted statesman should have foreseen the dangers which the repeal of the Missouri Compromise would involve. But Pierce was not farsighted, and he was not a great statesman; he was a man of fair abilities and excellent intentions, but was dominated by the leaders of his party.

Assault on Sumner. On February 11, 1856, President Pierce issued a proclamation calling for a halt to the violence and disorder existing in Kansas and appealed to Kansans to obey the laws. This proclamation was followed in May by a raid on Lawrence. Almost at the same time there occurred in Congress an episode which stirred the nation to new depths. On May 19 Senator Sumner of Massachusetts delivered a fiery speech, which he called "The Crime Against Kansas." As one historian says, Sumner freed his mind in a speech "as offensive and insulting to the South as the fertile imagination of the author could possibly make it." In the course of the speech Sumner made several sneering allusions to Southern leaders, especially Senator Butler of South Carolina. Two days later Butler's nephew, Representative Preston S. Brooks, attacked Sumner seated at his desk, and beat him to insensibility with a cane. The North was impressed by the attack on a man under such a disadvantage, but it ignored the provocation; the South saw that an Abolitionist had been soundly thrashed, and it ignored the circumstances.

Birth of the Republican Party. Far more important than such violent spasms of partisan feeling was the birth of a new political party, the new, long-dreaded sectional party. The circumstances of its organization are given in detail elsewhere (see REPUBLICAN PARTY), and it is only necessary here to point to the fact that the Kansas-Nebraska Bill was directly responsible for its existence.

Foreign Relations. During Pierce's administration the foreign relations of the United States were characterized by the same sense of national importance which brought about the annexation of Texas. It was an age of a crude belief in the universal superiority of Americans and American institutions, and an equally strong contempt for the monarchical institutions of Europe. An amusing side to this contempt was shown by a circular, issued shortly after Marcy became Secretary of State. It advised American diplomatic representatives at foreign courts not to wear ceremonial court uniforms, but to appear "like Franklin, in the simple costume of an American citizen." Thus Buchanan, then minister at London, had some difficulties with the Master of Ceremonies, but was finally allowed to attend "in the ordinary dress of an American citizen." But his biographer adds that to this dress, "in order to distinguish himself from the court servants, he thoughtfully added a small sword."

In its more serious diplomatic dealings a similar spirit was evident. In 1853 Martin Koszta, an Hungarian political refugee, returned to Europe before taking out his final naturalization papers. He was seized by the commander of an Austrian warship in a Turkish



port, but Captain Ingraham of the U. S. S. *Saint Louis* forced the Austrians to release Koszta, and the United States government gave Ingraham its approval. A most important matter was Perry's expedition to Japan, which resulted in opening Japanese ports to American commerce and introducing western civilization into that country (see PERRY, MATTHEW CALBRAITH). Nearer home was Hawaii, which Marcy attempted to annex in 1854; the plan failed only because the Hawaiian king died before arrangements were completed. The boundary question with Mexico was settled by the Gadsden Purchase (which see) of 1853. In similar fashion the long-standing dispute with Canada over the Atlantic fisheries was settled by treaty in 1854. Marcy, negotiating with the Earl of Elgin (which see), obtained equal fishing rights for American fishermen in exchange for certain concessions which were included in a commercial reciprocity treaty.

The Ostend Manifesto. The most serious problems in foreign relations concerned expansion southward, first to Cuba, and secondly to the Isthmus of Panama. The leaders of the South were eager to annex Cuba, and without question expected vigorous action from Pierce. Marcy, however, was cautious, although not opposed to annexation, and in 1854, after Pierre Soule, the American minister at Madrid, had nearly embroiled the United States in a war with Spain, instructed him to meet Buchanan, minister to England, and John Y. Mason, minister to France, to confer on a policy to be followed by the United States towards Cuba. The result of his conference was the famous Ostend Manifesto (which see).

Central American Problems. With Great Britain the United States argued certain questions involving a shadowy British protectorate over a large section of Central America. This Mosquito protectorate, Marcy instructed Buchanan, must be renounced, but the matter was finally allowed to dwindle to a diplomatic sparring. Marcy was more vigorous, however, in treating another problem at home in 1856, when the British minister at Washington seemed to lend his support to an attempt to secure recruits for the British army to serve in the Crimean War. Marcy thereupon refused to hold any further diplomatic intercourse with Crampton, the British minister—a step which might easily have led to war. Also, in 1856, the United States forced Denmark to abandon the

OUTLINE AND QUESTIONS ON FRANKLIN PIERCE

Outline

I. Early Life

(1) Birth and parentage
(2) Education
  (a) Associates at Bowdoin
(3) Law study

II. Political Career

(1) In New Hampshire legislature
  (a) Speaker of the house
(2) In national House of Representatives
(3) In the Senate
  (a) Youngest member
  (b) Stand on public questions

III. In Private Life

(1) Return to law practice
(2) The "Hale storm of 1845"
(3) In Mexican War
(4) "Compromise candidate" for Presidency in 1852
(5) Comparison with other candidates for nomination
(6) The election
  (a) Issues
  (b) Candidates
  (c) Result

IV. Administration

(1) Governmental affairs
  (a) Inaugural address
  (b) Selection of compromise Cabinet
  (c) The Kansas-Nebraska Bill
    1. Doctrine of popular sovereignty
    2. Effects in Kansas
    3. Overthrow of Pierce's compromise policy
  (d) The attack on Sumner
  (e) Birth of the Republican party
(2) Foreign relations
  (a) The Martin Koszta affair
  (b) Perry's expedition to Japan
    1. Opening of treaty ports
  (c) Attempt at Hawaiian annexation
  (d) Gadsden Purchase
  (e) Canada fisheries question
  (f) Ostend Manifesto
  (g) Central American problems
(3) Internal affairs of interest
  (a) Yellow fever epidemic at New Orleans
  (b) First "world's fair"
  (c) Railroad expansion westward
    1. Changes in agricultural conditions

Questions

How would you account for Pierce's nomination to the Presidency when there were many men in the field more able than he?

How did it happen that a distinguished American diplomat appeared at British court functions in his ordinary clothes and a small sword?

What act of Congress was directly responsible for the creation of a great political party which is in existence to-day?

Mention three friends of Pierce's during his college days, and tell for what each became famous.

What unusual honor did he receive when he was less than thirty?

What was the "Hale storm of 1845," and how did it prove Pierce a man of Southern sympathies?

What proportion of the electoral votes did he receive in 1852?

What distinction was attached to Pierce's Cabinet?

What former act of Congress was practically repealed by the Kansas-Nebraska Bill? What was the effect of this latter act in Kansas?

How did a United States Senator suffer during this administration for a rash speech he had made?

Who was William Walker? What attitude did the United States take toward his schemes, and what was the result?

When and where was the first "world's fair" held, and what was exhibited at it?

collection of its ancient "Sound dues," a toll which it had taken from foreign nations for centuries. In Nicaragua the United States gave official recognition to the government headed by William Walker, the filibuster. The general sentiment of the nation towards these complicated problems is clearly expressed by Nathaniel Hawthorne, who was then American consul at Liverpool, in a letter to a friend at Boston. He said:

> Our relations with England seem to me to bear a more pacific aspect than for many months past. Frank Pierce never did a better thing than in recognizing Walker's government; it has brought John Bull to his bearings, and with his customary growling and grumbling, he is going to back out. Crampton ought to have been dismissed more promptly; but it is better late than never.

Two weeks later Hawthorne wrote again:

> We have gained a great triumph over England, and I begin to like her better now. . . . . We have gone through a crisis and come out right side up. Give Frank Pierce credit for this, at least; it was his spirit that did it.

Domestic Prosperity. If slavery was the chief question, and during the last two years of Pierce's administration practically the sole question, in the public mind, there were, nevertheless, many other problems and events of interest. There were, for example, matters primarily of local interest, such as a terrible epidemic of yellow fever at New Orleans, which continued for a decade. There was the labor-saving exhibit in the Crystal Palace, at New York, which is usually called the first "world's fair."

More important by far was the remarkable westward expansion of American railroads, which reached a climax about 1856 and 1857. Between 1849 and 1857 seven trunk lines were constructed across the Appalachian Mountains, and most of these, by their connections in the central states, could reach the Ohio River and the Mississippi River. The rush of railway building was accompanied by a steadily increasing demand for government assistance. The first public grant, in 1850, was made to the Illinois Central Railway, and included 2,500,000 acres. "The West," said one rhapsodic Ohioan, "is no longer the West, nor even the Great West, it is the great Center."

The significance of railroad expansion was most clearly marked by changes in agricultural conditions. The grain of the interior found a larger market in the East and in Europe. The center of the grazing industry passed from the northeastern states to the newer states north of the Ohio and to Texas. In the South the railways helped to a lesser degree in extending the cultivation of cotton and increasing the prosperity of the cotton planters. The prosperity of the agricultural West and South were followed by a new industrial prosperity, by a great impetus to manufactures, in the East. The United States government, too, was so prosperous and had accumulated such a large gold reserve that Congress in the closing months of Pierce's administration passed the tariff of 1856, whose primary object was to reduce duties so that the revenue of the government might decline. At the end of Pierce's term the United States was prosperous and believed in a magnificent industrial, agricultural and financial future spreading before it.

After the expiration of his term, Pierce traveled in Europe for several years, and took no further part in politics. He died on October 8, 1869, and was buried at Concord, N. H. W.F.Z.

Consult Rhodes' *History of the United States from the Compromise of 1850;* Smith's *Parties and Slavery.*

PIERRE, *peer,* S. D., the state capital and the county seat of Hughes County, is centrally located in the state, 120 miles west of Huron. It is on the Missouri River, which is navigable but is little used for commerce, and on the Chicago & North Western Railroad. The river is crossed here by a large bridge, and on the opposite bank is Fort Pierre. The city is situated in a vast fertile country, formerly noted for cattle grazing, but gradually being opened to the cultivation of alfalfa, corn and forage crops. It is the largest live-stock market in the state and has publishing concerns, flouring mills, a tomato-canning plant and saddle and cigar factories. Features of interest are the state capitol, erected in 1909 at a cost of $1,000,000, a Federal building, the high school, Carnegie Library, Saint Mary's Hospital, the government industrial school for Indians, the state library and the United States land office. Pierre was settled in 1880, was incorporated in 1883, and in 1909 adopted the commission form of government. The public utilities are owned and profitably operated by the municipality. In 1910 the population was 3,656.

PIGEON, *pij'un,* a group of birds consisting of many species, found in all parts of the world and varying widely in habits. Some live in trees and others build their nests on the ground; some live in colonies and others in isolated pairs. The pigeon does not raise its head,

as do other birds, in swallowing; it is gluttonous in its eating habits, and has a very large crop. It is singularly defenseless before its enemies, building its rude nest in exposed places where it is in constant danger. The eggs are usually white in color, two in number, and are cared for during hatching by the male and the female in turn. The pairs mate for life. Pigeons of the temperate regions usually have a plumage of gray, brown or slate, often showing metallic reflections; those in the tropics and the Far East are more brilliantly garbed.

The most interesting pigeon of the eastern hemisphere is the *rock pigeon,* the ancestor of all the domestic varieties. The *passenger pigeon,* once common in Eastern North America, is now extinct, and the only wild representative of the family now surviving in this area is the *mourning dove,* a small species whose long-drawn-out "coo-c-o," not in reality a note of sadness, is familiarly known. A similar bird in Palestine, the turtledove, is mentioned in the beautiful lines in the *Song of Solomon:*

For, lo, the winter is past,
The rain is over and gone;
The flowers appear on the earth;
The time of the singing of birds is come,
And the voice of the turtle is heard in our land.

Pigeons have been domesticated from the earliest times. They were regarded by primitive peoples with much affection, and one of the indications of wealth was the number of dovecotes a man possessed. The Bible mention of turtledoves and pigeons is usually in connection with sacrifice. As in the case of the parents of Jesus (*Luke* II, 24), the poor were allowed to bring, instead of a lamb, two turtledoves or two young pigeons. The first-known law for bird protection, found in *Deuteronomy* XXII, 6, forbidding the killing of a mother bird on the nest, was probably largely for the benefit of the pigeon. Pliny wrote of pigeons, especially noting their manner in drinking—"not holding up their bills between whiles." M.A.H.

Consult Twombley's *The Pigeon Standard;* MacCleod's *Pigeon Raising.*

Related Subjects. The reader is referred to the following articles in these volumes:

Carrier Pigeon
Dove
Passenger Pigeon
Turtledove

PIGMENT. See PAINT.

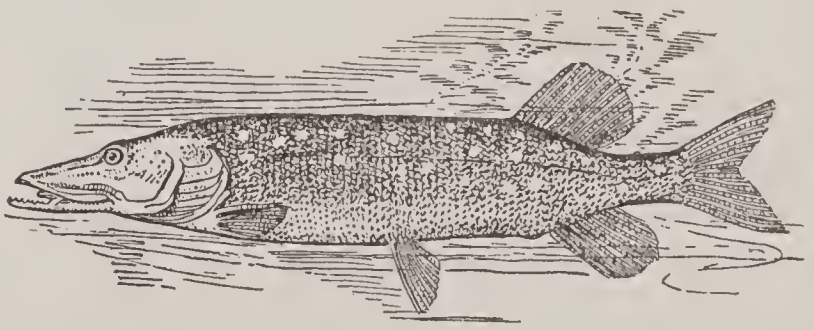
PIG'WEED, a common weed of the amaranth family, the strong, hardy root of which thrives in any soil capable of cultivation. This persistent weed sometimes grows two or three feet high, and produces large, coarse leaves and small, greenish flowers. The latter are borne on a densely-crowded spike. The leaves are sometimes covered with stiff hairs. Pigweed is best eradicated by thorough cultivation of the soil and complete uprooting of the plant. It was given its name because hogs are supposed to relish it.

PI'KA, any one of several species of rodents found on the heights of mountains in Asia, Europe and Western North America. Pikas are near relatives of the hare and the rabbit, but look much more like the guinea pig. The

THE PIKA
About one-fourth actual size.

American species, found just above the timber line, is a little creature about seven inches long, with a tail less than an inch in length. It has a rough, blackish coat, which is dirty white beneath. Pikas are inclined to be sociable with one another, and several are often found living together in a heap of rock fragments at the foot of a cliff. They are quite harmless, and feed on plants, industriously collecting hay and dried vegetables to use in the winter as food and bedding. Other names given them are *conies, little chief hares* and *calling hares.*

PIKE, any one of several species of soft-rayed, rather smooth-scaled fish, found in the rivers and fresh-water lakes of Northern Europe and North America and much prized for food. The pikes are everywhere noted for their re-



Pikes, the tyrants of the wat'ry plains.
—POPE.

markable appetites and fighting qualities, and they are a terror to other and smaller fish that share their waters; they kill more of them than they can devour. Caught on the end of a hook, a pike fights stubbornly, and this characteristic has made it attractive to sportsmen. The most

important species is the *common,* or *English,* pike, found abundantly in the Great Lakes and in smaller lakes in Canada and the Upper Mississippi Valley. It may attain a length of four feet, though larger and longer specimens have been caught which weigh forty pounds; in color it is bluish or greenish-gray, with irregular rows of whitish or yellowish spots. This fish is known also as *pickerel* in the United States, though that name is more correctly applied to a small species of pike. The *pike perch,* or *wall-eyed pike,* is a member of the perch family. See PERCH; PICKEREL.

PIKE, ZEBULON MONTGOMERY (1779-1813), an American soldier and explorer, for whom the best-known mountain peak in the United States was named. He was the son of an army officer, and was born at Lamberton, N. J. When but fifteen years of age he entered his father's regiment as a cadet, and five years later was made first lieutenant. The first of the exploring expeditions for which he is famous was begun in August, 1805; it had as its object the discovery of the headwaters of the Mississippi River. After penetrating to Cass Lake (Upper Red Cedar), he turned back to Saint Louis, and in July, 1806, set out to explore another portion of the Louisiana Purchase territory. He passed along the Missouri and Osage rivers into what is now Kansas, and perhaps north into Nebraska; then turning south he marched to the Arkansas River. Following this stream through the Royal Gorge to the present site of Pueblo, Colo., he sighted on November 23 the peak which later was named for him. In his search for the Red River, Pike, without knowing it, entered Spanish territory and was there detained for a time.

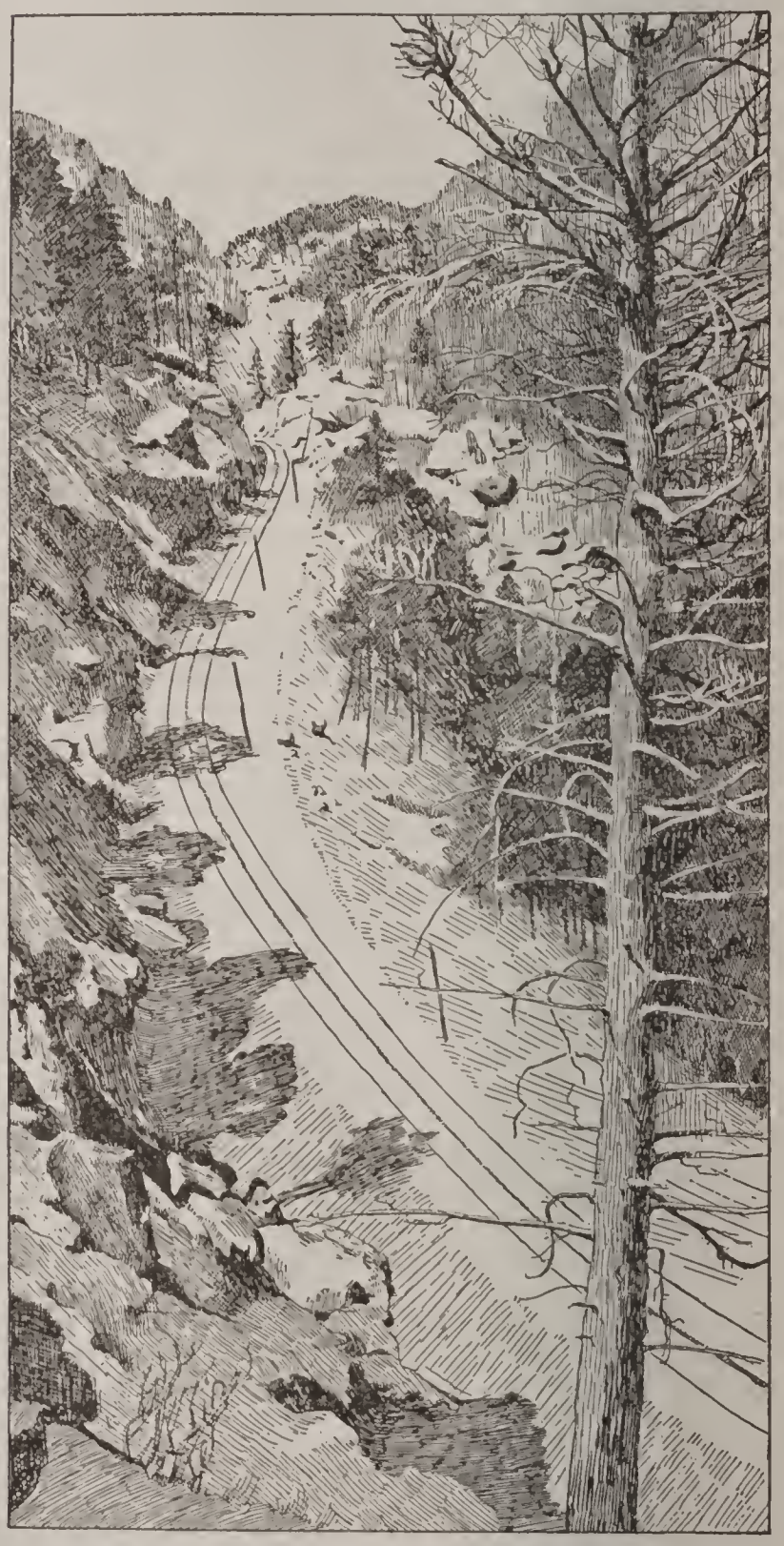
ZEBULON PIKE

He was promoted through various ranks to that of colonel (1812), and took an active part in the early stages of the War of 1812. In the attack on York, Canada, he was killed by a fragment of rock shattered by a British shell.

Pike published a book dealing with his explorations, bearing the extended title of *An Account of an Expedition to the Sources of the Mississippi and Through the Western Parts of Louisiana, and a Tour Through the Interior Parts of New Spain.* It was not well written, but was an authentic report of a new land and was translated into European languages.

See PIKE'S PEAK; for other exploring expeditions in the West, see LEWIS AND CLARK EXPEDITION; FREMONT, JOHN C.

PIKE'S PEAK, the best known, though not the highest, of the Rocky Mountains peaks in Colorado. A summit of the Rampart range,

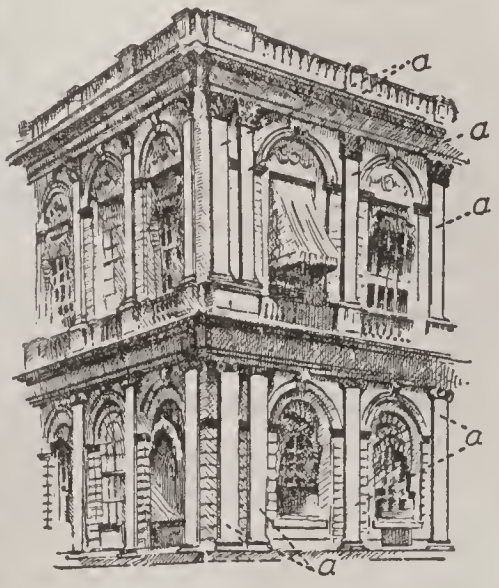


PIKE'S PEAK RAILWAY

it lifts its snow-capped peak 14,108 feet above sea level, and is covered with pine forests to a height of 11,700 feet. It was discovered in November, 1806, by Lieutenant Zebulon Montgomery Pike, U. S. A., who climbed part way up but lost his way and had to turn back. He declared the peak could not be reached, but the ascent was made by members of Major Long's

exploring expedition in 1819. At the present time the ascent can be made either on horseback or on the cog-railway, nine miles long, which runs to the summit. The peak is situated six miles west of Colorado Springs and sixty-five miles south of Denver. On a clear day the view from its summit over the great plains and mountains, with their beautiful lakes and rivers, is enchanting. See PIKE, ZEBULON MONTGOMERY.

PILASTER, *pi las'ter,* a square pillar projecting from a wall or pier from one-fourth to one-third its width and finished with a base and capital like a column. The pilaster originated in Greek architecture and was adopted by the Romans, who sometimes gave it the tapering form of a column. Pilasters are used for ornament and also for supporting an arch or a cornice. The finest pilasters are found in the Italian Renaissance style of architecture. See ARCHITECTURE, subhead *The Renaissance and After.*



PILASTERS

The letter *a* locates pilasters. The building shown is a corner of the old City Hall, New York City.

PILATE, *pi'layt,* PONTIUS, the Roman governor of Judea, Samaria and a part of Idumea at the time of the crucifixion of Christ. Officially he was known as *procurator.* Pilate, a narrow-minded man, was not fitted to be a ruler over Jews and Gentiles alike, for he was never able to understand the national pride and the intensity of religious feelings of the Jews. When the Jews demanded Christ's death he insisted on a trial, and in spite of the charges of false teachings and claims of kingship, Pilate failed to find Jesus politically harmful, and would have released him, had he not feared to lose his office. An account of this trial is given in *Matthew* XXVII.

Of the last years of Pilate's life it is only known that he was called to Rome to defend himself against charges of cruelty. Some have alleged that he died in Gaul by suicide; others that his body was thrown into the Tiber River. Again, tradition disposes of his remains in a lake near Lucerne, Switzerland, but this last legend seems very doubtful.

PIL'CHARD, a species of fish found in European waters, belonging to the family of herrings. These fish frequent the coasts of Great Britain all the year round. They grow to a length of about ten inches, and are bluish-green on the back, silvery-white on the sides. Unlike the herrings, which come near land to spawn, the pilchard lays its eggs far out from shore. It is found in great abundance off the Channel coast of England, the Cornwall fisheries being the most celebrated in that section. The Mediterranean Sea is also an important fishing ground. Schools of pilchards are taken in nets in vast quantities, 10,000 hogsheads, holding about 3,000 each, often being a single day's catch. When salted and cured these fish form an important article of food, especially to the people of the Mediterranean countries. Many fish called *sardines* are really young pilchards preserved in oil.

PILCOMAYO, *peel ko mah' yo,* a shallow river of South America, rising on the eastern slope of the Bolivian Andes, from which it flows through rich forests until it joins the Paraguay River nearly opposite Asuncion. Formed by the union of several small streams, its course for many miles is narrow and winding, and full of rapids and cascades, but when it reaches the flat country, after dropping about 5,000 feet, it spreads into broad lagoons. It flows southeastward, forming part of the boundary line between Paraguay and Argentine Republic, although much dispute as to boundary lines has been caused because it enters the Paraguay River by three mouths, the two outer ones being twenty-four miles apart. As the average depth of the Pilcomayo is not over four feet, it is too shallow for navigation, even by flat-bottomed boats.

PILE, a stake sharpened at one end, driven into soft ground to support buildings, or used in the construction of bridges, piers and wharves. Tree trunks of considerable size are most commonly used. The top of the log is protected by an iron band so as to keep the log from shattering under heavy blows, and the bottom is often shod with cast iron to enable it to penetrate compact soil. A battering-ram, usually driven by steam power, is used for driving the pile into position. Cast-iron or steel piles are now frequently substituted for wood. Cofferdams are temporary enclosures in water which consist of rows of piles driven close together. See COFFERDAM.

PIL'GRIMS, the name given the little band of liberty seekers who founded Plymouth

Colony in Massachusetts in 1620. The name grew out of an expression used by Governor William Bradford, who often referred to the colonists as "pilgrims and strangers upon the earth." They belonged not to the Puritans, as

TO THE FOREFATHERS
National monument, at Plymouth, Mass.

is usually said, but to a sect which grew out of Puritanism, whose members were called *Separatists,* because they separated from the Church of England. The first church of Separatists was at Gainsborough, England; a second and more powerful one grew up at Scrooby. Driven out of England by persecution, the Separatists established themselves first at Amsterdam and then at Leyden, in Holland.

Consult Griffis' *The Pilgrims in Their Three Homes;* Gregg's *Founding of a Nation.*

Related Subjects. The reader is referred for further details to the following articles in these volumes:

Mayflower	Plymouth Rock
Plymouth Colony	Puritans

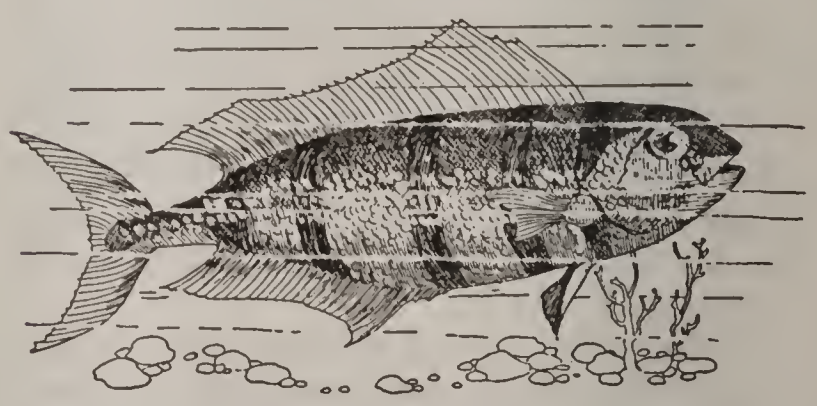
PILLARS OF HERCULES. See HERCULES, PILLARS OF.

PILLORY, *pil'o ri,* an old instrument of punishment which consisted of wooden posts and a platform, with a framework so constructed that the head and hands of the culprit, and sometimes his feet, also, could be thrust through holes, exposing him to public view and the scorn and ridicule of the people. The holes for the feet were called *stocks.* In times long past the pillory was one of the chief sights of every English village, where it was used for all manner of offenses of not too serious a character. Daniel Defoe, author of *Robinson Crusoe,* was pilloried for publishing a book without a license; women were often placed in it, and to make their degradation the deeper sometimes their heads were shaved.

THE PILLORY

From England it was introduced into the New England colonies in America, and was a favored means of punishment, particularly in Massachusetts and Rhode Island. It was usually occupied by "notorious drunkards, scolds, bawds" and other undesirable persons. Its use persisted for many years; indeed, until 1905 the state of Delaware legalized its use; it was the last state in the Union to abolish the pillory as a legal means of punishment, but for over a hundred years no person in the state had been sentenced to the pillory.

PI'LOT FISH, a species of fish included in the mackerel family, found usually in tropical and the warmer temperate seas, but seen occasionally off the coast of Great Britain. It is about twelve inches long and silver-gray in



THE PILOT FISH

color, striped with bars of a very dark blue; this coloration is very noticeable even at a distance. The fish has delicate flesh which resembles mackerel in flavor, but it is not often found in markets because of its rarity.

The name is derived from its habit of accompanying ships and sharks; its close companionship with the latter has excited much comment, many observers believing that it guides the shark to its food. It swims close in front of the shark, but probably does this for the purpose of feeding on fragments which the larger fish scatters, and to secure protection from its enemies. It is believed that the pilot fish is never attacked by its giant friend. By the ancients it was regarded as sacred, as they thought it directed lost sailors, and by suddenly disappearing announced that land was not far distant.

PIL'SEN, a city in Bohemia, noted for its famous Pilsener beer. The municipal brewery occupies one quarter of the city, and its cellars extend for miles. Pilsen is about sixty-eight miles southwest of Prague, and ranks next to that city in size among the cities of Bohemia. It is well built, and has beautiful promenades and several notable structures. The church of Saint Bartholomew, with its spire 335 feet high, dates back to the thirteenth century; the Renaissance Town Hall contains the hall in which Wallenstein received from his generals the oath of fidelity. The first printing press in Bohemia was set up in Pilsen. In addition to the breweries, there are glass works, copper works, bell foundries and manufactories of paper, pottery, leather, wire and vehicles. Population in 1921, 88,447.

PIMA, *pe'mah,* a tribe of North American Indians living in the Gila River and the Salt River reservations in Southern Arizona. Ruins of pueblos on the south bank of the Gila indicate that at one time they lived in adobe houses, which were never rebuilt after destructive wars with the Apaches and other invading tribes. They have since lived in dome-shaped huts made of bent tree boughs, plastered over with mud. From earliest times the Pima have irrigated their fields, running canals from the river and distributing the water by means of ditches and rude dams. They raise crops of wheat and corn and the most common vegetables, and use the beans of the native mesquite for food. The women of the tribe, who do all of the work except plowing and sowing, are very skillful in the making of water-tight baskets.

The Pima Indians are a peaceful tribe, and the wars they have fought have been wars of defense. They are exceedingly skilful with the bow and arrow, and have used them until very recently. The tribe numbers about 4,200.

PIMENTO, *pi men' toh,* the popular name of a small evergreen tree of the myrtle family, from which is obtained a spice known as allspice, Jamaica pepper or pimento. The name is derived from *pimienta,* the Spanish word for peppercorns, to which the spice bears a resemblance. The tree grows to a height of from twenty to thirty feet; occasionally it is forty feet tall. The slender, upright trunk has many branches at the top and is clothed in a smooth, gray bark. The shining green leaves are lance-shaped; they contain an essential oil, and are aromatic when fresh.

The flowers are small, white and fragrant, and bear four greenish-white petals, and numerous white stamens, which are longer than the petals. The fruit is a small berry, black, glossy, sweet and juicy when ripe, and about the size of a black currant. It is the unripe berry that is used for the spice of commerce, for the fruit loses much of its aromatic property by maturing. The process of preparing the berries for the trade is described in the article ALLSPICE.

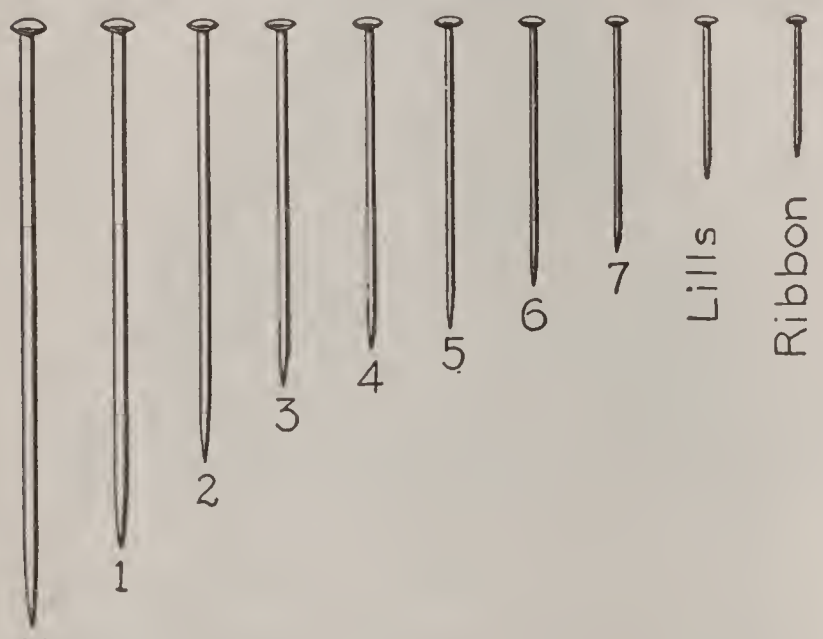
The pimento plant is native to the West Indies, flourishing most abundantly in Jamaica, where the greater part of the commercial spice is obtained. The tree also occurs in Mexico, Costa Rica and Venezuela. The pimento begins to flower when from seven to ten years old, and reaches maturity about ten years later. The weather during the fruiting season greatly affects the size of the crop, but under favorable conditions some trees yield 150 pounds of fresh berries, or 112 pounds of dried ones. The yearly export from Jamaica is about 11,275,000 pounds, two-thirds of which is sent to England.

PIN. A pin is such a commonplace device that we never consider its value until we are sorely in need of one. Nevertheless, there are over 75,000,000 gross of toilet pins made in the United States alone every year, and to these must be added 24,000,000 gross of hairpins and 8,425,000 gross of safety pins, if we consider the pin industry in its entirety. The value of the entire output is about $5,000,000 a year.

But pins were not always so plentiful or so cheap as they are now. According to tradition there was a time when the people of England were taxed to provide the queen with money to buy pins. This same tradition tells us that it was from this custom that the term *pin money* was derived. Be this as it may, we know that in early times thorns, pointed sticks, bones and other articles were used for pins. In Egyptian tombs, pins of bronze, highly ornamented, have been found, some of them six or eight inches in

length. The immediate forerunner of the toilet pin in common use to-day was a pin made of brass wire. It had a head consisting of a coil of fine wire wound around one end of the shank and soldered to it; there are people still living who remember pins of that style. In 1824 Lemuel Wright, an American, obtained a patent for a machine to make pins out of a single piece of wire. Wright's machine has been greatly improved, but its invention was the first step in the modern method of pin manufacture.

Pin Making. The pins used to-day are turned out with incredible rapidity by a wonderfully ingenious machine, into which brass wire is fed from a reel (see WIRE). The wire is straightened, cut into proper lengths and seized by lateral jaws beyond which just enough of the wire protrudes to form a head. A blow from a die flattens and shapes this end into the head. The pins are then carried forward until



STANDARD SIZES OF PINS

the lower end is brought into contact with revolving files, which grind the point. The pins are thus shaped, and only the finishing remains to be done. This is accomplished by boiling them for several hours in a preparation of tin. They are then washed and given a higher polish by being rolled in a cylinder filled with bran or fine sawdust.

The machine which sticks the pins into the papers in which they are sold is hardly less ingenious than that which forms them. It crimps the paper and thrusts the pins in place at the same time. From a hopper the pins are conveyed to a plate containing as many slots as there are to be pins in a row in the packet. The paper, properly crimped, is brought against the pointed ends of the row of pins, and a tap on the heads thrusts the pins into place. The whole operation is very rapid. M.R.T.

PINCHOT, *pin'sho,* GIFFORD (1865-), governor of Pennsylvania, pioneer in movements for conservation of America's timber supply. Some of the results of his years of labor are stated in these volumes in the article CONSERVATION. Pinchot was born at Simsbury, Conn., of well-to-do parents. After graduating from Yale, where he earned the reputation of being "mad on trees," he studied forestry in France, Germany, Switzerland and Austria. On his return to America he began his first systematic work in forestry at Biltmore, N. C., on the estates of George W. Vanderbilt. In 1896 he was made a member of the National Forest Commission, and in 1898 was appointed chief of the Division of Forestry. In 1901 this department became the Bureau of Forestry and since 1905 has been known as the Forest Service of the United States Department of Agriculture. He served as its chief until 1910, when he was elected president of the National Conservation Committee. Besides serving on various other committees, after 1903 was a professor of forestry at Yale. In 1922 he was elected to the governorship of his state, on the Republican ticket.

GIFFORD PINCHOT

The remarkable organization and extensive work of the Forest Service is the best testimony to his energy, wisdom and executive ability. He is the author of *The White Pine* (in collaboration with Professor H. S. Graves), *The Adirondack Spruce, A Primer of Forestry* and many papers and magazine articles. See CONSERVATION; FORESTS AND FORESTRY.

PINCKNEY, *pink'ni,* CHARLES COTESWORTH (1746-1825), an American statesman and soldier of the Revolutionary and early national periods. He was born at Charleston, S. C., and was educated in England and in France. At the time of the break between England and the colonies he was practicing law in Charleston. Pinckney was an enthusiastic member of the first provincial congress called by South Carolina, and he entered the army when hostilities began. During the war he served as aid-de-camp to Washington and rose to the rank of

brigadier-general; when peace was declared he returned to his law practice. Later he was a member of the Constitutional Convention in Philadelphia, and of the convention that framed a constitution for the state of South Carolina. In 1796 he was appointed United States minister to France, and took part in the negotiations with Talleyrand concerning relations between France and the United States. In this connection he is said to have uttered the famous reply to Talleyrand's hint for a bribe, "Millions for defense, but not one cent for tribute. See X Y Z Correspondence.

PIN'DAR (about 522-445 B. C.), the greatest of Greek lyric poets. He belonged to a noble family and lived at Thebes, in Boeotia. His poetry is more representative of Greece as a whole than that of any other Greek writer, largely because he traveled more widely. Rulers in all parts of Greece sent for him from time to time to compose for them poems celebrating their own glory or that of their states; and he was so much beloved and honored that when Alexander the Great razed Thebes to the ground, and all the other houses were destroyed, that of Pindar was left standing. The poet Milton notes the honor done his memory in these words:

> The great Emathian conqueror bade spare
> The house of Pindar.

His style was magnificent, and no translation into a modern language can give an adequate idea of the music of his lines. He was the first Greek writer to proclaim the immortality of the soul and to portray a judgment after death. Many of his lyrics were composed to be sung by a trained chorus of youths and maidens. There are extant, practically entire, four books of triumphal hymns composed in honor of the victories at the Olympian, Pythian and other great Greek games; also various fragments of hymns to the gods, processional odes, dancing songs, dirges and eulogies.

PINE, the name of about eighty distinct kinds of evergreen cone-bearing trees which are more important to man than any others used for timber. Nearly one-half of this number grow in America, from the Arctic circle to the mountains in districts near the equator. They may be distinguished from the rest of the cone-bearing family by the arrangement of their needles, grouped from one to five in little, paperlike sheaths. The pines called "soft," because of their soft wood, shed these sheaths when the needles reach full growth, but the resinous "pitch" pines keep them until the leaves fall. While the trunks are straight and tall, frequently reaching 250 feet, the shapes of the trees vary from round to pyramidal, and the length of the cones, from one to eighteen inches. Although the pines, so useful to man, and so widely distributed, thrive in almost any soil and place, they prefer sandy uplands, and can live but a short time in unusually smoky cities where, it is believed, the gases choke them.

Species. Among numerous species, the most useful is the stately *white pine,* growing from Newfoundland south as far as Illinois, in the mountains to Georgia, and in extensive forests in Idaho. This tree is the lumberman's favorite, but its popularity has made it scarce, and other woods, chiefly yellow pine, are being used in its place.

The *Georgia, yellow, Southern* or *long-leaf* pine, most important and widely spread of southern timber trees, ranking next to the *white* pine, is found in a belt about 125 miles wide, from Mississippi to Virginia. It may be recognized by its orange-brown branches, large cones and needles more than a foot long. From the latter pine wool and an oil much like turpentine are obtained. This species, valuable for its resinous products, often grows more than 100 feet high.

The *great sugar pine,* one of the most important timber trees on the Pacific coast, sometimes called the most beautiful of its family, reaches a height of 220 feet, with a diameter of perhaps ten feet, yielding satiny, golden lumber, used principally for furniture and interior finishing. White sugar crystals form on the wood when it is burned, and from this fact the tree takes its name. Among many other species, some of those best known are the *loblolly, slash* or *swamp, bull, silver, red* and *nut.* Of European pines the *Scotch* and *Corsican,* or *black,* are familiar.

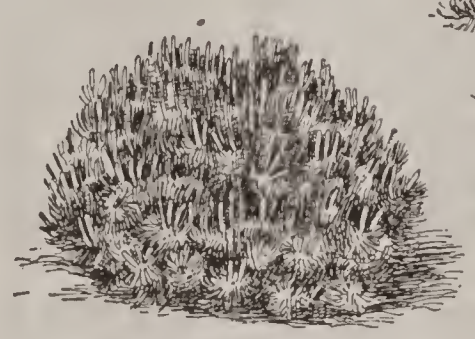
Pine Industry. The pine industry is one of the greatest, in spite of the fact that metal is now used for many purposes formerly requiring wood. A few of the hundreds of ways in which pine lumber is utilized are the following: for ship masts, telegraph poles, railway ties, frameworks, matches, furniture, shipbuilding, beams, flooring, bridges and interior finishing. The largest sawmill in the United States is at Palouse, Idaho, its entire output being white pine lumber. In 1912 this state alone furnished 362,759,000 feet of *western,* or *Idaho white,* pine. The same year yellow pine supplied one-half the total output of soft wood lumber.

THE PINES

Yellow Pine

White Pine

Sugar Pine

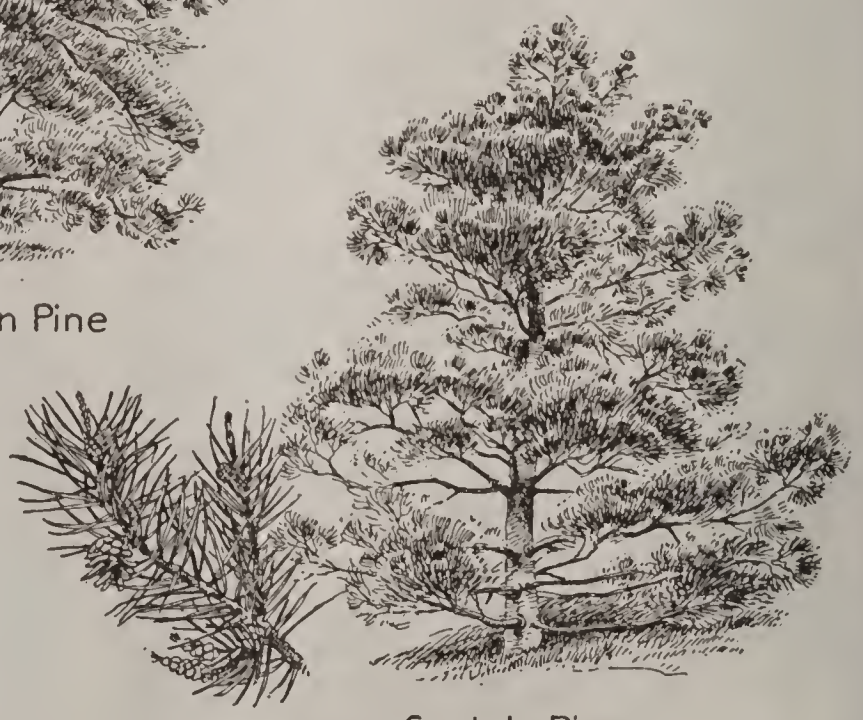


Dwarf Pine

Corsican Pine

Stone Pine (Italian)

Norway Pine



Scotch Pine

But the wood products are only a part of pine culture. The naval-stores industry, which includes turpentine and tar gathering, is now of great importance to the United States and other countries. A forest of 10,000 long-leaf pines should yield annually for four years about 400 barrels of liquid resin, from which tar, pitch, turpentine and rosin are extracted. With the price of turpentine averaging thirty-five cents per gallon, and rosin two dollars a barrel, the value of these by-products is enormous. In times past the waste involved in resin gathering was serious, but improved methods have reduced it and have put to good use many constituents which formerly escaped in steam and smoke. Stumps and branches left in pine forests after the woodsmen have done their work are now turned into slabs, lath, shingles and bundles of faggots which are sold for fuel; and a wonderful invention has made it possible to extract ethyl-alcohol, the highest grade known, from sawdust.

In the south, long-leaf pine saplings are shipped in large quantities for Christmas greens, a practice which threatens the supply of that variety of tree. The European pine also has great economic value. Its inner bark is twisted, dried, mixed with meal and made into food, while the fibers are prepared and, under the name of *wold wolle* (wood wool), are woven into durable cloth. See FORESTS AND FORESTRY.

The Pine Tree in Literature. Not only has the pine a high commercial value, but it has also been the theme of many beautiful verses. Among them all none are more expressive than these from the poem *The Pines,* written by the Canadian, Robert Service:

On the flanks of the storm-gorged ridges our
black battalions massed;
We surge in a host to the sullen coast, and we
sing in the ocean blast;
From empire of sea to empire of snow we grip
our empire fast.

To the niggard lands were we driven, 'twixt
desert and foes are we penned;
To us was the Northland given, ours to strong-
hold and defend;
Ours till the world be riven in the crash of the
utter end;

Ours from the bleak beginning, through the aeons
of deathlike sleep;
Ours from the shock when the naked rock was
hurled from the hissing deep;
Ours through the twilight ages of weary glacier
creep.

Wind of the East, Wind of the West, wandering
to and fro,
Chant your songs in our topmost boughs, that the
sons of men may know
The peerless pine was the first to come, and the
pine will be last to go! M.K.

Consult Pinchot's *Primer of Forestry;* Shaw's *The Genus Pinus.*

PINE'APPLE, a delicious and fragrant tropical fruit common in all markets. It received its name from its resemblance to a pine cone, and is usually about the size of a cocoanut, though the very large varieties may weigh from sixteen to twenty pounds. Under its thorny, reddish skin there is a firm, pale-yellow meat. Protected by its hard covering, it will stand more rough handling and keep longer than any other tropical fruit, and it can be obtained throughout the year. Its excellent and distinctive flavor makes the pineapple a favorite dessert fruit.

THE PINEAPPLE

The plant, which is a biennial (see BIENNIALS), grows about two feet high and produces a single axis and flower stalk. The fleshy part of the stalk forms the fruit, which is crowned by a cluster of leaves. It was introduced into Europe by the Spaniards after their explorations in South America; the earliest mention of its use in England was made by Evelyn in his *Diary,* in which he speaks of having tasted a pineapple from Barbados at the table of Charles II. For many years it was cultivated in private gardens in England and on the continent of Europe, but owing to the great development of pineapple culture in the tropics, the hothouse plant is now rare. The European markets are largely supplied by the plantations of Northern Africa, the Canaries, the Azores and the West Indies, and Queensland is the source of the Australian supply.

A considerable area in the United States, practically all of which is in Florida, is well adapted to the culture of pineapples, the sandy soil of the Keys being ideally suited to the growing of this fruit. The annual crop of Florida is over 779,000 crates, valued at more than $735,000. There are also small districts in Southern California, Georgia and Texas where pineapples

are grown. In recent years the finer varieties of pineapples have been extensively grown in Florida under sheds built of lath nailed two or three inches apart on a light frame, to protect the plant from excessive heat and frosts.

The largest part of the supply of canned pineapple found in American markets comes from the Hawaiian Islands; the value of the annual shipment from Hawaii is about $6,000,000, and of pineapple juice, about $50,000. The pineapples from Hawaii sell for less in the United States than the home-grown fruit, because of the greater expense of raising the latter. Considerable quantities are also imported from Porto Rico, the West Indies and the Philippine Islands. A delicate fabric, the Pina muslin of the Philippines, is woven from the fiber of the leaves.

Consult Rolfs' "Pineapple Growing," in United States Department of Agriculture *Farmers' Bulletin 140.*

PINE BLUFF, Ark., the county seat of Jefferson County, is located in the southeastern part of the state, forty-two miles southeast of Little Rock, the state capital, and 140 miles southwest of Memphis, Tenn. It is on the Arkansas River, which is crossed here by a combined highway and railroad bridge costing $700,000, and has a packet line to the mouth of the river, which connects there with Mississippi River boats. It is served by the Saint Louis, Iron Mountain & Southern and the Saint Louis Southwestern railroads. The population in 1910 was 15,102; it was 19,280 in 1920, a gain of 28 per cent. The area of the city exceeds four square miles.

Pine Bluff is in the extensive pine and oak lumber belt of the South and in a fertile agricultural section where crop failures are practically unknown. Cotton is the principal crop. The chief industrial plants are cotton compresses, cottonseed-oil and meal mills, boiler and sheet-iron works, a foundry, large lumber and stave mills, a spoke factory, and hardwood flooring plants whose output in 1920 was worth $9,095,000. Here are located railroad shops of the Saint Louis Southwestern. Natural gas is piped to the city from the Caddo fields. Pine Bluff has the State Colored Normal College, Merrill Institute, with a gymnasium and free library, a Federal building and a courthouse. The annual fairs of the state fair association are held here.

PINERO, *pi ner' o,* Arthur Wing (1855-), an English dramatist, born in London, the son of a Jewish solicitor. He began to prepare himself for the profession of law but soon became interested in the theater and appeared as an actor in Edinburgh in 1874. Later he was a member of the Lyceum Company of London, gaining much valuable knowledge, under Henry Irving, of stage life and stagecraft, which doubtless had much to do with his later success as a writer of plays.

The Second Mrs. Tanqueray, a drama somewhat startling in plot, possibly is his greatest success; *Trelawney of the Wells* was long a favorite; *The Notorious Mrs. Ebbsmith* was a problem play. Other dramas presenting social problems were *The Profligate* and *The Squire.*

PINES, Isle of. See Isle of Pines.

PINE-TREE SHILLING. From 1652 to 1682 there were coined in Massachusetts shilling pieces which bore on one side the date of issuance with the words *New England* and on the other a pine tree, surrounded by the word

THE PINE-TREE SHILLING
Obverse and reverse.

Masathusets. These coins, which were of silver and almost as large as a modern half-dollar, were at first called Boston shillings, or Bay shillings, but it is the later name of "pine-tree shilling," first used in 1680, by which the coin became known in history.

The original coins issued in Massachusetts had had no raised edge and had thus suffered much from clipping, and it was to prevent this evil that the pine-tree money was surrounded with a double border with the words "Masathusets" and "New England" between. Threepence and sixpence pieces similar to the pine-tree shillings were also coined. In *Grandfather's Chair* Hawthorne presents an interesting tale of colonial days in which the famous old pine-tree shilling figures largely.

PING PONG is the outdoor play of lawn tennis adapted to parlor purposes. Almost any table can be used, though there are regulation sizes of playing surfaces which range from five and a half to nine feet in length and from three to five feet in width. The height of the little net should be three-fourths of an inch for each

WORLD BOOK

Photo by E. M. Newman

PINEAPPLES.

A Hawaiian pineapple farm, a splendor of green and pink when fruit is ripening. Below is close view of cultivation.

PINEAPPLES. Above: A young pineapple field. Below: Ripe fruit, some of the "pines weighing ten pounds each The scenes are in Hawaii.

foot in length of the table. The balls and bats are miniature copies of those in outside use. With a few exceptions, the rules of the game are the same. Volleying is not allowed, the stroke is underhand and but one ball is served.

PINK, a flower whose very name suggests a breath of spicy fragrance and a vision of sweet, old-fashioned gardens, its favorite dwelling place. The name, probably taken from its original color, is but one of several, the broad-leaved blossoms having once been called *sweet William,* and those with narrow petals, *sweet John.* Nowadays the finely-fringed, clustered pinks with their grass-like leaves are quite liable to be white, purple, red or a combination of colors, but the pleasant clove odor is always characteristic of them. The modest little flowers in all their varieties, *Scotch, China, pheasant's eye, grass* and *feathered,* are natives of Europe and of Asia from China to Russia and as far south as the Pyrenees Mountains. Their popular cousin, the *carnation,* grows wild in Mediterranean countries.

And I will pu' the pink, the emblem of my dear,
For she's the pink o' womankind, and blooms without a peer. —BURNS.

(Above, a clove pink.)

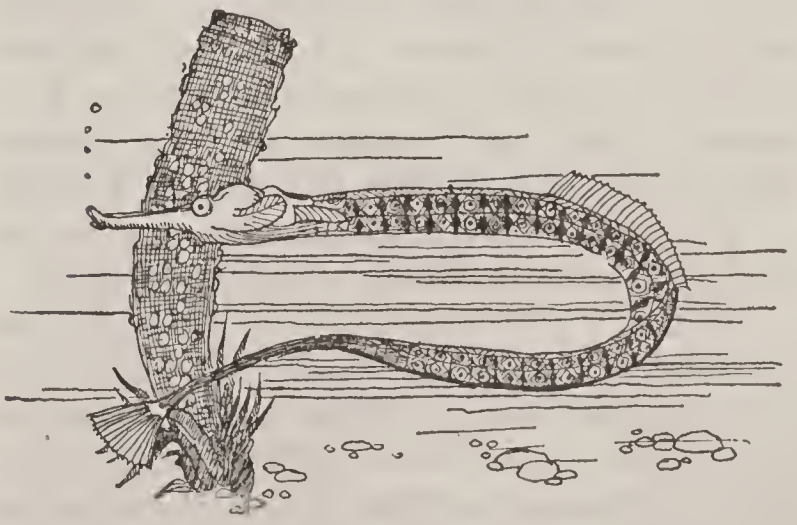
PINKERTON, ALLAN (1819-1884), a notable American detective, was born in Scotland, but spent most of his life in the United States. He emigrated in 1852, and in that same year settled in Chicago, where he became deputy sheriff and later head of a detective agency, which still exists. His work was unusually successful, and soon after the outbreak of the War of Secession he was given the task of organizing a Federal Secret Service, of which he was made the chief. He never gave up his work in Chicago, however, and established branch agencies in New York and Philadelphia. Pinkerton's writings include *The Molly Maguires and the Detectives, The Spy of the Rebellion, Criminal Reminiscences* and *Thirty Years a Detective.*

PIPE, TOBACCO, a small bowl, fitted with a hollow, reedlike stem, for the smoking of tobacco. Pipes of a very simple kind had probably been used in England for the smoking of medicinal herbs before tobacco became popular, but it was the introduction of tobacco that gave the pipe maker his trade. The American Indians, who have smoked tobacco from the most ancient time, carved the pipe bowls out of stone or shaped them of clay, and often decorated them quite gayly with figures of men and beasts. The pipe of the Indian was more than a relaxation; it had a ceremonial use as well, and the smoking of the peace pipe was a most important event (see CALUMET).

When the Europeans acquired the habit of smoking, they used first either a pipe of silver or a walnut shell with a straw thrust into it, but better devices were soon discovered. As both clay and brier root take up much of the unhealthful nicotine liquor before it reaches the mouth, pipes came to be made of these substances. For finer pipes, meerschaum was first used in Germany, but the custom soon spread to other countries (see MEERSCHAUM). Sometimes the bowls alone are made of meerschaum, sometimes the entire pipe. The commonest mouthpieces are of amber, silver or ivory. Holland early took the lead in pipe making, and still produces porcelain pipes with huge bowls, often painted in brilliant colors.

Orientals smoke the most curious of pipes—the hookah. The bowl is fitted into an air-tight vase partly filled with water, and a tube passes downward into the water. A flexible tube with a mouthpiece is fitted into the side of the vase, and the smoke passes through the water before it enters the mouth. It is thus cooled and is rendered less harmful to the system.

PIPE'FISH, the name applied to a group of fishes which have a characteristic tubelike snout, ending in a small, narrow, toothless mouth, opening upward. A remarkable feature of the



THE PIPEFISH

family is a pouch in the male, in which the eggs are placed by the female; there they are kept until hatched. The young also remain there until able to care for themselves. The body of the pipefish is long, slim and snakelike, is cov-

ered with bony plates and varies from eighteen inches to three feet in length. Pipefish are found in the warmer seas and are related to the hippocampus (which see).

PIPE OF PEACE, a name applied to the CALUMET, which see. See also, PIPE, TOBACCO.

PIP'IT, or **TIT'LARK,** a small American song bird, about seven inches in length and of quiet, brownish plumage. It frequents open tracts and is easily recognized by its graceful walk and its habit of wagging its tail. Because of this habit it is grouped with the family of warblers known as the *wagtails,* but it also has a delightful habit of the larks, that of singing while on the wing. It is found throughout North America, wintering in the Gulf states, Mexico and Central America. Its favorite nesting ground is Labrador. Its nest, built of grasses, is placed on the ground, and the eggs, four to six in number, are grayish-white or bluish-white in color, thickly speckled with dark brown. Species of titlarks are found in most parts of the eastern hemisphere.

PIPPIN, *pip'in.* See PEPIN.

PIQUA, *pik'wa,* OHIO, in Miami County, an industrial city in the west-central part of the state, seventy-two miles northwest of Columbus and twenty-six miles northwest of Dayton. It is on the Great Miami River and the Miami & Erie Canal, and is served by the Cincinnati, Hamilton & Dayton Railroad and the Pennsylvania Lines. Electric interurban lines extend to cities north and south. In 1910 the population was 13,388; in 1920 it was 15,044, a gain of 12 per cent. The area of the city is four square miles.

The industrial importance of Piqua is due to the water power obtained from the river. The city has sheet-steel mills, iron works and manufactories of stoves and ranges, furniture, handles, shovels and tools and underwear. Features of note are Fountain Park, a Federal building, erected in 1915 at a cost of $135,000, a Y. M. C. A. building, the Schmidlapp Free School Library and Ball Memorial Hospital.

PIQUET, *pe ket',* or *pik'et,* a game of cards, played by two persons, with a deck from which all spot cards between the ace and seven-spot cards have been removed. The game is generally for 100 points. The players draw for first deal, high winning. The deck is shuffled and cut in the usual way, and is dealt two cards at a time, until each player has twelve cards, the remaining cards constituting the stack from which discarded cards are replaced. The non-dealer may discard five cards, but he must discard one; the dealer, in his turn, may discard three, but he is required to discard one. Players must take from the stack as many cards as they discard. The rules for counting are complicated.

Before discarding, if either player discovers he has nothing but spot cards in his hand, he can claim *carte blanche* and score 10. The one who has the greatest number of cards in a suit claims points, and scores 1 for each card in his suit; *sequence* is the greatest number of cards in regular succession (as 7-8-9-10, etc.) and counts 10 more than the number of cards in the sequence; 4 cards of a kind (as 4 kings) or 3 of a kind, count 1 for each card. In playing, the leader of each trick counts 1 for his card, the winner of the trick also counts 1, the winner of the last trick counts 2; the player who succeeds in winning more than six tricks counts 10 for cards; if a player wins all the tricks, he wins a *capot,* which counts him 30 additional. Special and complicated rules govern the winning of a *pique,* 30 points, and a *repique,* 60 points. See CARDS, PLAYING.

Consult Hoyle's *Games.*

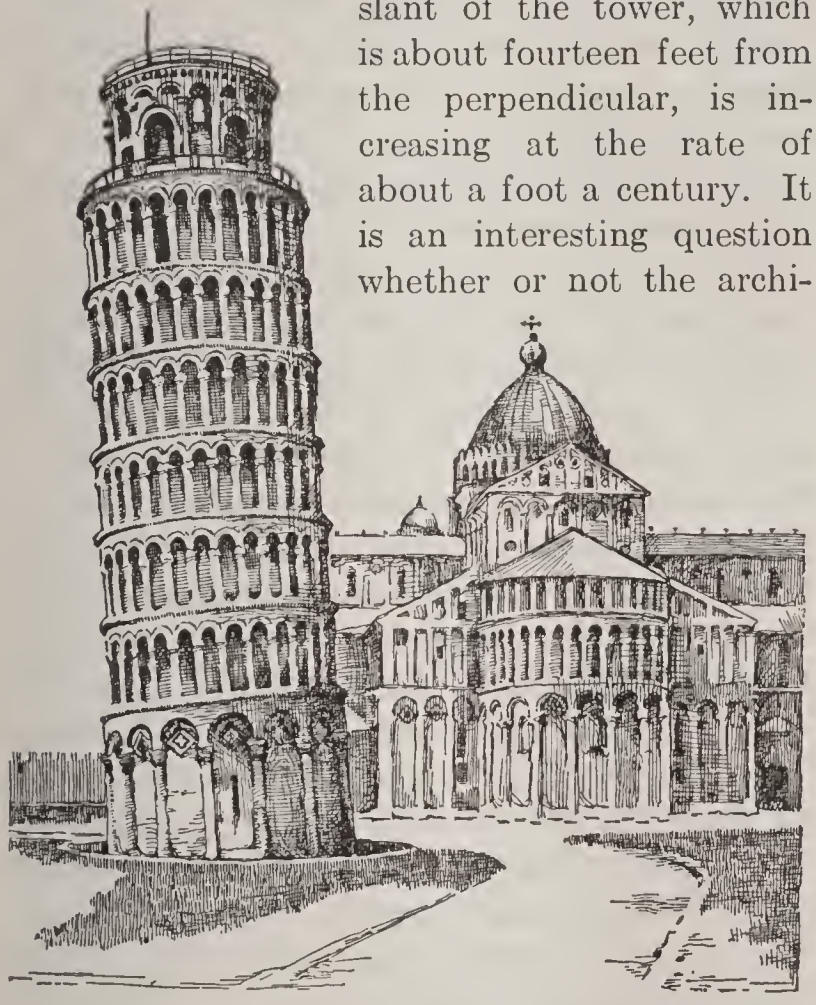
PIRAEUS, *pi re'us,* the port of the city of Athens, Greece, famed in ancient times as a magnificent city, one of the master works of the age of Pericles (which see). It was built in 493 B. C., was connected with Athens by the famous Long Walls, and was destroyed in 86 B. C. At present it is a modern city, situated about five miles southwest of Athens, has three excellent harbors, and next to Syra is the largest port in Greece. It is a port of call of various steamship lines, consequently is in direct communication with Trieste, Constantinople, Smyrna, Marseilles and Alexandria. Over one-half of the foreign trade of Greece passes through Piraeus. The manufactures are textiles, leather, liquors and macaroni. Population, about 50,000.

PI'RATES AND PIRACY, *pi'ra si.* In the days when piracy flourished pirates were the freebooters of the seas, corresponding to bandits on land. They owed allegiance to no banner but their own—the black flag. Their recklessness and cruelty have been told in countless stories of adventure, nowhere more thrillingly than in Stevenson's *Treasure Island.* Piracy is a crime punishable by death, in international law, and it has been banished from the seas, for the ships of strong nations have become the police force of the world. No advanced civilized nation of modern times has countenanced acts of piracy, but early in the nineteenth cen-

tury the United States had to fight with Tripoli, Algiers and Tunis to protect its ships from piratical attacks in the Mediterranean (see BARBARY STATES). A distinction is made between piracy and privateering (see PRIVATEER).

PISA, *pe'sah,* or *pe'zah,* a city of Italy famed for its beautiful marble bell tower (see subhead below). It is situated in the northern part of the country, on both banks of the River Arno, six miles from the Mediterranean Sea and forty-nine miles west of Florence. Pisa contains a university founded in the fifteenth century and an academy of fine arts, established by Napoleon, and the town possesses many valuable art treasures. The house where Galileo was born is a feature of special interest. Industrially the place is important as a center of cotton manufacture, and it has a prosperous trade in oil and marble. It is the capital of the province of Pisa (in Tuscany), and in 1914 had a population of 66,432 (including suburbs).

Leaning Tower of Pisa. This celebrated structure is a noble example of Romanesque architecture; its erection covered the period from 1174 to 1350. It rises to a height of 179 feet, and has the bells in the eighth story. The slant of the tower, which is about fourteen feet from the perpendicular, is increasing at the rate of about a foot a century. It is an interesting question whether or not the architects who erected the tower intended it to slant, but most authorities think the oblique position was an accidental feature of its construction. The walls, made entirely of marble, are thirteen feet thick at the base and between six and seven feet thick at the top. Semicircular arches, supported by fifteen columns, surround the lowest portion; above these rise six arcades, each of which has thirty columns, and a top story, with twelve columns. An inner staircase of nearly 300 steps leads to the top, from which the visitor may obtain a magnificent view of the city and the distant sea. Near it is a beautiful marble baptistry, and in front is a fine cathedral.



LEANING TOWER OF PISA

Consult Ross and Erichsen's *Story of Pisa.*

PISA, COUNCIL OF, the name of a council called at Pisa, Italy, in 1409, to terminate the schism which had agitated the Roman Catholic Church for thirty years. At that time the Church was divided in its allegiance to two Popes, Gregory XII and Benedict XIII. At the Council of Pisa the rival Popes agreed to abdicate, so that a new Pope might be chosen with undisputed title. At the appointed time, however, they failed to comply with the agreement, and both were deposed. Alexander V was elected, but Gregory and Benedict refused to waive their rights, rendering the condition worse; the schism continued eight years longer, and was then ended by another council which met at Constance.

PISCES, *pis'eez,* THE FISHES, one of the constellations of the zodiac, without one conspicuous star, notable only as containing the first of Aries, or Vernal Equinox. It now occupies the sign of Aries, the first sign of the zodiac, and contains a pretty double star, Alpha. Pisces is the twelfth sign of the zodiac, into which the sun enters about February 19. The symbol of Pisces is ♓. According to Greek mythology, the Fishes are Venus and her son Cupid, who were turned into fish when fleeing from the monster Typhon. The old Babylonian year of 360 days was supplemented every six years by an extra month; to this month was given the sign of the *Fishes of Ea,* or Dagon, the fish god celebrated in Chaldean legends of the Deluge. For illustration, see STARS.

PISCICULTURE, *pis'i kul ture.* See FISH, subhead *Fish Culture.*

PISISTRATUS, *pi sis'tra tus* (612-527 B. C.), a tyrant of Athens, the son of Hippocrates, and a friend and relative of Solon. Being very ambitious for power, he became leader of the party of the Highlands—one of the three parties into which Athens was divided. It was composed chiefly of the poor and discontented citizens, and their favor was easily won by his generosity. Claiming that he had been subjected to violent attacks, Pisistratus succeeded in gath-

ering a large number of supporters; with this strength he seized the Acropolis in 560 B. C. and declared himself tyrant of Athens. Solon died shortly thereafter, and Pisistratus endeavored to carry out his Constitution, but in five years was forced by his opponents to leave the country. He was twice reëstablished, permanently about 540 B. C., and on his death he entrusted his two sons, Hippias and Hipparchus, with the power he laid down.

As a whole, the reign of Pisistratus was distinguished for its beneficence, its support of the poor and its patronage of literature. The scholars gathered at his court prepared a new edition of the poems of Homer. From the state revenue he was enabled to construct magnificent buildings and improve the water supply; the idle were set to work on plantations, and the poor were provided with food and clothing. Temples were erected to Dionysus at Limnae and at the foot of the Acropolis, and to Athena, also on the Acropolis; the Lyceum was built, and the magnificent temple to the Olympian Zeus was begun. See GREECE, subtitle *History.*

PISTACHIO, *pis tah' shi o,* or *pis ta' shi o,* a small tree native to Syria, cultivated chiefly in countries bordering on the Mediterranean Sea. Pistachio nuts, the stones of the olivelike fruit of the tree, are valued for their bright green, oily kernels, the delicious flavor of which makes them popular for flavoring candies, cakes and ices. Oil pressed from them is used in cooking. The tree is a member of the *pistacia* genus, which contains several other valuable species. Among these is the *turpentine* tree, which yields a honeylike, greenish-yellow liquid called Cyprus turpentine. An agreeable gum resin is obtained from the *batoum* tree, found in Northern Africa. Another species, native to Cochin-China, is the source of a fragrant oil used in flavoring ointments.

PITCAIRN, *pit' kairn,* **ISLAND,** an island belonging to Great Britain, situated in the Pacific Ocean. It was first colonized by nine of the members from the *Bounty* mutiny, who with six men and twelve women, natives of Tahiti, landed there in 1790. Treachery and debauchery resulted for a few years. In 1800 all the men were dead except John Adams, who did his best to establish a successful and properly-conducted colony. In 1830 the islanders removed to Tahiti, but returned to Pitcairn in a year. In 1856 the islanders were all taken to Norfolk Island, but two families soon returned and were followed by others. The population is now about 220.

The soil of the island is fertile and produces sweet potatoes, yams, melons, bananas, coffee and arrowroot. Goats and chickens are plentiful and run wild. The natives speak a Tahitian dialect, but most of them understand English.

PITCH. See TAR.

PITCHBLENDE, *pitch' blend.* See RADIUM.

PITCH'ER PLANTS, a family of plants the leaves of which are so constructed as to form a trap for insects. The common pitcher plant of North America, which grows in bogs and swamps from Labrador south to Florida, is typical of the group. By a curious folding together of their margins, the leaves of this plant form hollow, pitcherlike receptacles, in which rain water collects. At the mouth of each pitcher is a thick growth of bristly hairs, all pointing downward and inward, and when insects, attracted by a sweet secretion within the rim, fly into the trap, they are unable to turn back because of the hairs, and so are drowned. The entrapped insects are absorbed by the plant as food (see CARNIVOROUS PLANTS). Local names of the plant are *side-saddle flower, huntsman's cup* and *Indian dipper.* Its flowers grow singly on long, slender stems, and are deep reddish-purple in color and globe shaped. A related species, found on the Pacific coast, has pitcher traps so large that they capture small birds and field mice.

An illustration of this plant appears in the article BOTANY, page 858.

PIT'MAN, SIR ISAAC (1813-1897), an English educator who was knighted by Queen Victoria for his invention of the system of shorthand writing which is known by his name. He was born at Trowbridge, in Wiltshire, studied at the normal college of the British and Foreign School Society at London, and in 1832 began teaching at Barton-on-Humber. Later he taught at Wotton-under-Edge and at Bath, but after 1843 devoted himself entirely to developing his system of phonography, or shorthand, which was first given to the public in 1837 in his *Stenographic Sound-Hand.* This was not the first shorthand method invented, but it was so much superior to all that had preceded it that it practically superseded all earlier efforts. From 1842 until his death Pitman published the weekly *Phonetic Journal,* and he took a keen interest in spelling reform, publishing several pamphlets on that subject.

There are two systems of Pitman shorthand writing, that by Isaac Pitman and a later adaptation by Ben Pitman; the latter, an American, has popularized his work in the United States,

while the system of Isaac Pitman is most used in England. The main difference in the two is the reversal of the order of position of the vowel sounds. See SHORTHAND.

PITT, the family name of two English statesmen, father and son, both of whom achieved distinction.

William Pitt, first Earl of Chatham (1708-1778), was known before his elevation to the peerage as the GREAT COMMONER. He was born at Westminster and was educated at Eton and at Trinity College, Oxford, but owing to ill health did not take a degree. In 1731 he entered the army, but four years later gave up all idea of a military career and became a member of Parliament from Old Sarum, the family borough. Almost immediately he became a noteworthy figure in the House of Commons, and Horace Walpole (which see) found in him one of his sharpest critics. One speech in particular which was credited to him became famous and has always held a place in collections of declamations—the one beginning—

WILLIAM PITT
First Earl of Chatham.

> The atrocious crime of being a young man, which the honorable gentleman has with such spirit and decency charged upon me.

This speech, however, was reported on hearsay by Dr. Johnson, and doubtless contains more mannerisms of the latter than of Pitt. His determined opposition to Walpole brought him a reward when he least expected it; the Duchess of Marlborough, dying in 1744, left him a legacy of £10,000, or $50,000.

The Empire Builder. In 1746 Pitt received his first office, that of Vice-Treasurer of Ireland, and later in the same year was made Paymaster-General, with a seat in the Privy Council. By his refusal to accept in this position the special emoluments which previous holders of the office had taken without question, Pitt won for himself the complete confidence of the people, and so advanced his career. Dismissed from office in 1755 because of his outspoken criticism of the Ministry's war policy, Pitt was made Secretary of State and leader of the House of Commons in 1756. Here again he failed to hold the regard of the king, and was accordingly forced to resign within a year, but the nation spoke its feelings so strongly that the king was compelled to recall him at once. As virtual head of the government, of which the Duke of Newcastle was the nominal head, Pitt turned his attention to making England a great power among the nations, and much of the praise for campaigns which overthrew France and won England glory in America and in India belongs to him. Indeed, it is not too much to say that it was he who began to build the Empire of Great Britain.

A Friend of America. When George III came to the throne in 1760, Pitt's fortune began to change, for the new king had no love for the great Minister. In 1761, therefore, Pitt resigned, and remained for five years out of office, though he still exerted a powerful influence in public affairs. Especially did he oppose the imposition of taxes on the American colonies; this policy made him very popular in the subject country. In 1766 he was called upon to form a new Cabinet, and was at the same time created Earl of Chatham. His acceptance of the peerage decidedly lessened his popularity, and his health was so poor that he was able to take only a subordinate part in the work of the Ministry; he did not oppose the tea tax of 1767 which was so utterly in opposition to his known principles.

In 1768 he resigned and never afterward held office, though he still took a keen interest in public affairs and did not cease to oppose in the House of Lord's the government's policy toward America. On April 7, 1778, he made his last appearance in the House, and delivered a lengthy speech against the proposal of making peace with the colonies because France had offered them aid, a proceeding which he felt was equivalent to England's humiliating itself before its old enemy, France. At the close of the speech he fell fainting, and a month later he died. He was buried in Westminster Abbey, where a monument was erected to his memory.

Estimate of His Career. Pitt holds a place in English history not only as one of the greatest, perhaps the very greatest, of the country's war Ministers, but as the first successful public man who depended for his support, not on king or Parliament, but on the nation as a whole.

In America Pitt was recognized as the colonies' stanchest friend in the home government, and when Fort Duquesne was rebuilt it was named in his honor Fort Pitt; this later became Pittsburgh. A.MC C.

The wars referred to above in 1755 were known in Europe as the Succession Wars, and in America as the French and Indian Wars. Both series are described in these volumes under their proper headings. Consult Stanhope's *Life of William Pitt;* Roseberry's *William Pitt,* in "Twelve English Statesmen" series.

William Pitt (1759-1806), the younger son of the above, is considered by many historians to be the greatest Prime Minister England has ever had. He was born at Hayes, near Bromley, in Kent, and entered Pembroke Hall, Cambridge, when but fourteen years of age. Of delicate health and somewhat austere manner, he made no friends at the university and took no part in its social life, but he displayed a maturity and a capacity for learning which amazed his teachers. After his graduation in 1780 he studied law and was admitted to the bar, but never practiced, for he began his Parliamentary career the following year. His very first speech attracted favorable attention; it was not unworthy of the man who later took rank as the superior of Burke and of Sheridan and the equal of Fox.

A Youthful Premier. The first minor official position offered him Pitt declined, because nothing less than a Cabinet office could satisfy him; in 1782 he became Chancellor of the Exchequer in Lord Shelburne's Ministry. Meanwhile, he had shown his interest in Parliamentary reform by introducing a bill in Parliament which was defeated by but a few votes. This interest was unabated until the stormy days of the French Revolution compelled him to abandon his efforts. After the Shelburne Ministry and the succeeding coalition government had been defeated, Pitt became Premier in December, 1783, when not twenty-five years of age. He had come to office at a difficult time, for the majority in the House of Commons was against him, and it was felt that he would soon be forced to resign; but he persisted until by his oratory and evident sincerity of purpose he had won popular favor, and then, early in 1784, he appealed to the country. The general election gave him a large majority, and save for the interval between 1801 and 1804, he ruled England till the close of his life.

What He Sought to Accomplish. His first problems were financial, and these he met most successfully by many wise measures. He reformed the administration of the East India Company, improved the loan system, abolished scores of well-paid but useless offices, and in 1786 established a sinking fund for the reduction of the national debt. He also attempted to provide for free trade with Ireland and to put through a reform bill, but in these efforts was defeated. His heart was in these economic measures, for he was preëminently a peace Minister, but he was forced to become a war Minister during a very troubled period of his country's history. As long as possible he refrained from interfering in the affairs of France, but in February, 1793, the latter country declared war against England. In the conflict which followed Pitt's policy had two aims—to defeat France on land and to destroy its power on the sea. Chiefly through the genius of Lord Nelson the latter object was accomplished, but the English army was weak and the war on land had to be conducted by allied nations who were aided by large English subsidies. These allies frequently failed to carry out Pitt's plans, to England's deep disappointment.

His Second Ministry. In 1800 Pitt brought about the Parliamentary union of Ireland and England, but to Roman Catholic emancipation, which he had intended to couple with the measure for union, King George III obstinately refused to give his consent. Pitt therefore resigned in 1801 and was succeeded by Addington, whom he supported as long as he conscientiously could. The war with France, brought to a close for a time by the Peace of Amiens, was reopened in 1803, and in the next year Pitt was again asked to take charge of the government. He formed a coalition with Russia and Austria against France, but the two allies were defeated at Austerlitz in December, 1805, and Pitt, already worn with the struggle, did not long survive the disaster. He realized fully the ambition and the powers of Napoleon and what they would mean to Europe, and exclaimed shortly before he died, "Roll up the map of Europe; it will not be wanted these ten years."

His Character. Pitt lacked the warm-hearted, sympathetic qualities which distinguished his great rival, Charles Fox, and showed in all his acts a pride and aloofness which frequently made him disliked. But this very pride was the sign of the intrepidity, the uprightness which won him the trust of king, Parliament and people. He never stooped to anything low, and his ambition was far above mere cupidity. Titles and honors were offered, but he declined them, though always ready to bestow such favors on others. Morally he was pure and upright to a degree, which won for him ridicule from the laxer spirits of his day. A.MC C.

In addition to references above, see GREAT BRITAIN, subtitle *History,* relating to this period;

NAPOLEON I, up to 1805. Consult Macaulay's *History of England;* Green's *History of the English People.*

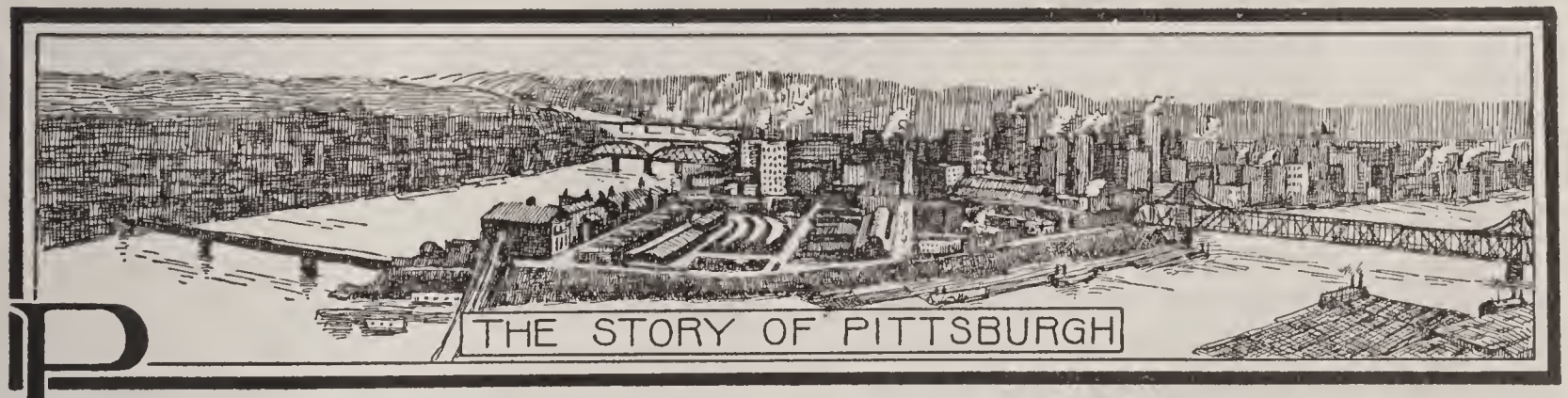
PIT'TI PALACE, a famous palace at Florence, Italy, begun in 1440 after designs by Brunelleschi. He died when but the first story had been built, and the remaining two stories were not added until over a century later. The original designs had been lost, and new ones were made, but despite this change of plan the building ranks as one of the most imposing palaces in the world. Much rough stone was used in its construction.

Originally built for the Pitti family, whose head was chief magistrate of the republic, it became in the sixteenth century the property of the grand dukes of Florence and to-day is one of the residences of the king of Italy. A new vestibule and stairway, quite in keeping with the rest of the building, were added in the latter part of the nineteenth century. The Pitti Palace is particularly noteworthy for its collection of paintings, one of the finest in the world, containing works by Raphael, Titian, Andrea del Sarto, Dürer, Rubens, Rembrandt and others.

PITTSBURG, KAN., a city in Crawford County, in the southeastern corner of the state, 129 miles south of Kansas City. It is on the Atchison, Topeka & Santa Fe, the Saint Louis & San Francisco, the Kansas City Southern and the Missouri Pacific railroads and has electric interurban service. The population, which in 1910 was 14,155, had increased to 18,052 in 1920, a gain of 22 per cent. The area of the city is nearly five square miles.

In Pittsburg is located the Kansas Manual Training Normal School. Other prominent features are the public library, Y. M. C. A. building and Lincoln Park. The city is the center of important bituminous coal operations, and ships annually 7,000,000 tons, valued at about $15,000.000.

In this city are the shops of the Kansas City Southern Railway, a foundry, machine shops, and manufactories of vitrified and building brick (annual output, 1,000 carloads), mattresses, artificial stone, knives and other commodities. Pittsburg was settled in 1876 and incorporated in 1880. The city has adopted the commission form of government, and owns the water system.



PITTSBURGH, PA., the second city of the state in population and in manufactures, ranking next to Philadelphia. It is popularly called THE STEEL CITY, as it is the center of the world's largest manufacturing district for iron and steel. It is the county seat of Allegheny County, and is situated in the southwestern part of Pennsylvania, where the Monongahela and Allegheny rivers unite to form the Ohio River. What is known as the Pittsburgh Metropolitan District includes Homestead, McKeesport, Wilkinsburg, Braddock and more than fifty other boroughs, all intimately associated commercially and socially with the greater city. Taken as a unit, the district excels Philadelphia in manufactures. The city of Allegheny, on the opposite bank of the Allegheny River, was annexed to Pittsburgh in 1907. The original Pittsburgh lies in the "point" formed by the meeting of the Monongahela and Allegheny rivers, and is built mainly on hilltops, some of which rise to heights of more than 500 feet. The uneven surface necessitates the use of bridges, of which there are about fifty within the city limits, besides many railway bridges and those owned by private corporations. No other city in the United States has so many bridges.

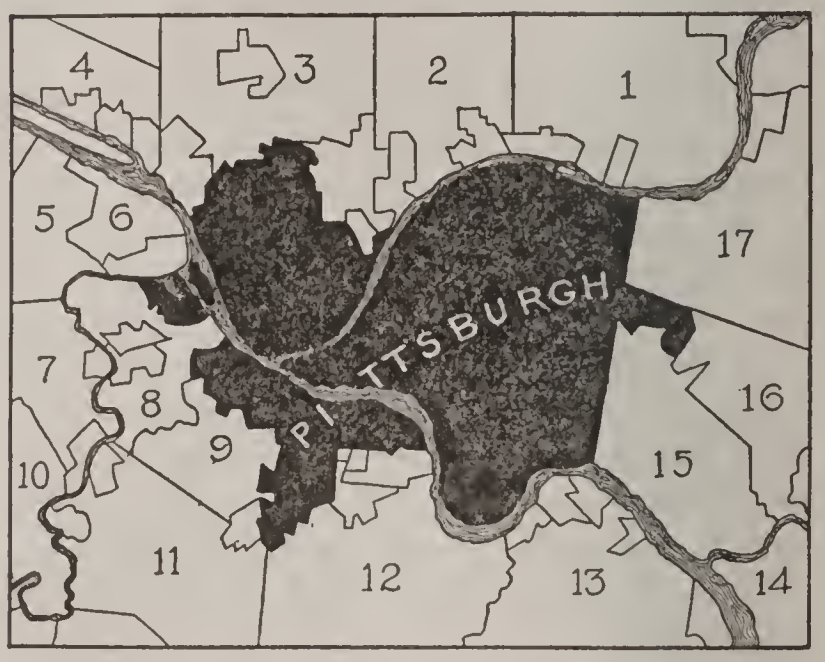
Characteristic Features. Docks, warehouses, tenements and manufacturing plants are crowded into the "point" near the river, wherever low, suitable sites are found. Along the river banks for more than twenty miles are situated the immense rolling mills, blast furnaces, foundries and various other manufacturing plants of the Pittsburgh District. In the early days these plants, using soft coal, caused much smoke, and consequently the city was nicknamed THE

Smoky City. Recently, however, a Bureau of Smoke Regulation was established in the city Department of Health, and as a result of the campaign begun the smoke has been materially reduced. Through the dense mass of buildings is woven a network of railroads, and the rivers, made navigable by dams, seem to be moving streams of coal, iron ore and various kinds of somber-looking freight. Back of the manufacturing center is the business section—the office buildings, banks, and wholesale and retail houses.

The most attractive residential places are in the east end of the city, on the hills overlooking the Allegheny River from the north and the Monongahela River from the south. The entire city is piped for natural gas, which is used for domestic fuel and almost entirely supplants artificial gas for light. In 1910 the population was 533,905; in 1920 it was 588,193, (10 per cent gain), making the city ninth in rank among the cities of the United States (see City, for tables). Germans, Irish and Italians are the most numerous among the foreign born, and with other races comprise about one-fourth of the entire population. The city covers an area of nearly thirty-nine square miles.

Parks and Boulevards. All efforts to beautify the city are concentrated in the residential sections and in the suburbs, since little can be done in the manufacturing districts along the river. Schenley Park comprises more than 400 acres and is one of the most beautiful parks in the Union; it was the gift of Mrs. Mary E. Schenley, of London, England, a native of Pittsburgh. The park contains the Phipps Conservatory and the Hall of Botany, the gifts of Henry Phipps; the Carnegie Institute and Library, a music pavilion, a race track, several fine bridges, and statues of E. M. Bigelow, Col. Alexander L. Hawkins, a hero of the Spanish-American War, and Robert Burns. Its flower conservatories are among the largest in the United States. Picturesque Highland Park, overlooking the Allegheny River, which comprises more than 360 acres, has an attractive entrance and contains a zoölogical garden, three shelter houses and fine statues, of which the most notable is that of Stephen Collins Foster. These two parks, which are the largest in the city, are connected by boulevards.

There are many smaller recreation grounds, of which Riverview, Herron Hill, McKinley, Lawrence, Grandview and West End parks are the most notable; altogether these recreation grounds cover more than 1,300 acres. Thomas Boulevard, Morewood, Ellsworth, North Highland and Amberson avenues, and the eastern parts of Fifth and Penn avenues, are some of the more exclusive residential districts, and costly residences may be seen in Squirrel Hill, Shadyside, Homewood, Bellefield and East Liberty districts. South Hills and Schenley Farms have been recently opened as residential sections. Oliver, Fifth and Liberty avenues, and Wood, Smithfield, Federal and Diamond streets are the principal thoroughfares, and Fourth Avenue is the Wall Street of Pittsburgh.



THE METROPOLITAN DISTRICT

(1) O'Hara	(10) Collier
(2) Shaler	(11) Scott
(3) Ross	(12) Baldwin
(4) Kilbuck	(13) Miflin
(5) Kennedy	(14) Versailles
(6) Stowe	(15) Braddock
(7) Robinson	(16) Wilkins
(8) Chartiers	(17) Penn
(9) Union	

Education. The most notable of the city's public institutions are the Carnegie Library and the Carnegie Institute, in Schenley Park, which were established by a gift of $10,000,000 from Andrew Carnegie, in 1895. The institute consists of an Institute of Technology, the Gallery of Fine Arts and the Museum of Science, both of the latter being housed in the Central Library building. The library contains about 425,000 volumes. The Carnegie Free Library of Allegheny is a separate foundation, which has an annual appropriation from Pittsburgh. For higher education the city has the University of Pittsburgh, formerly the Western University of Pennsylvania, founded in 1787; the Pennsylvania College for Women; Duquesne University, formerly the College of the Holy Ghost (Roman Catholic); the theological seminaries of the Presbyterian, United Presbyterian and Reformed Presbyterian churches; Pittsburgh, East Liberty and Shadyside academies, and other institutions. There are many modern, well-equipped public kindergartens.

Buildings. Pittsburgh shows evidence of its prosperity in its magnificent churches, for which it is noted. All denominations find places of worship in the 400 religious edifices, so the prophecy of Arthur Lee, the American diplomat, who visited the town in 1784, is not likely to be fulfilled. He said:

> The place I believe will never be very considerable, it is likely to be damned without benefit of clergy, since there is not a priest of any persuasion, nor church nor chapel.

Besides the buildings of the Carnegie Institute and Library, Pittsburgh has many imposing public edifices; among the most notable are the Allegheny County courthouse and jail, which occupy two separate blocks and are connected by a "bridge of sighs;" the costly Federal building, and the Frick building, constructed of granite, with white marble finish throughout the interior. The Union, Arcade, Carnegie, Henry W. Oliver and Chamber of Commerce buildings, and those of the First National, Farmers' Deposit and People's Savings banks are structures of the finest modern "skyscraper" variety. Memorial Hall, erected to the memory of Allegheny County's soldiers, is a noteworthy structure which was completed in 1910 at a cost of $1,700,000.

Benevolent Institutions. Few cities of the United States are so well equipped as Pittsburgh to care for the unfortunate. There are about twenty hospitals, twelve of which are important and receive aid from the state. The largest general hospital is the Western Pennsylvania. There are the United States Marine Hospital, homes for newsboys, for widows and for orphans, harbors for the friendless and the unfortunate, and asylums for the blind, the deaf and the dumb. Sarah Heinz and Irene Kaufman settlement houses are memorials to the wives of two prominent citizens. The Western Pennsylvania Hospital for the Insane at Dixmont cares for hundreds of patients.

Commerce. The prosperity of Pittsburgh is due to its location in one of the largest and most productive fields of coal, petroleum and natural gas in the world. Access to the vast coal fields of West Virginia is had through the Monongahela River, and to the coal and oil fields of Western Pennsylvania through the Allegheny River, while the Ohio River affords commercial relations with important points on 2,500 miles of waterways. The transportation facilities of these rivers are greatly increased by the service of a number of railroads, by which the city has connection with all parts of the country. These are the Pennsylvania, the Baltimore & Ohio, the Buffalo, Rochester & Pittsburgh, the Pittsburgh & Lake Erie, the Bessemer & Lake Erie, the Wabash Pittsburgh Terminal, the Montour and the West Side Belt Line. Interurban electric lines radiate from the city in all directions. Coal, coke and the products of its industries are the leading articles of commerce, and the city is important as a distributing point for lumber, dry goods, groceries and merchandise.

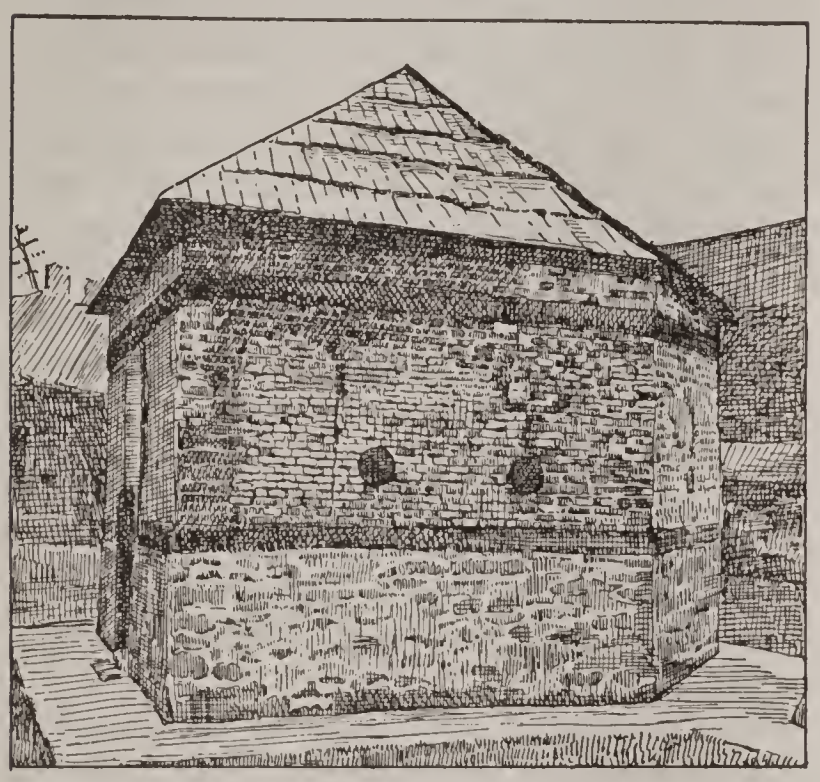
Industry. The abundance of cheap fuel has attracted to the locality those great industries which need fire for their operation. The Pittsburgh district is not only the greatest coal-producing (bituminous), but the largest coal-consuming, center in the country; natural gas which formerly gave impetus to manufactures is now used chiefly for domestic purposes. Some of the largest blast furnaces in the world and the most extensive plants for making steel rails, armor plate for battleships and structural work for steel bridges are located here. Pittsburgh might well be called the *hearth of the nation;* these immense furnaces, factories and foundries that produce so much smoke also send up great tongues of flame which illuminate the sky by night, and make the locality visible for many miles.

Pittsburgh leads the cities of the world in the manufacture of steel and iron products, plate and window glass and glass tableware, steel cars, air brakes, electrical machinery, corks and fire brick. In Allegheny are located the main factories of the largest pickle and preserving company in the country, famous for the "57 varieties" of its products. Besides these, there are refineries of petroleum and copper, factories for making optical and surgical instruments, slaughtering and meat-packing plants, printing and publishing houses, and manufactories of stogies, small cigars which had their origin here. Pittsburgh produces more than sixty per cent of the coke made in the United States.

History. George Washington visited the present site of Pittsburgh in 1753, and advised the erection of a fort there, as the place had command of the rivers. Accordingly, a fort, or blockhouse, was begun at the "Forks" in the February of the following year, but the detachment of militia sent to occupy it was forced by the French and Indians to abandon the post. The building of Fort Duquesne by the French followed; it was taken by the English under General Forbes in 1758, who called the place *Pittsburg,* in honor of William Pitt, the Brit-

Prime Minister. The fort was conspicuous during the Revolutionary and French and Indian wars; the only remnant of the extensive fortifications is the *Blockhouse,* built by Colonel Henry Bouquet in 1763, and now owned by the Daughters of the American Revolution. The town was organized in 1764, and the borough was incorporated in 1794.

In 1811 the first steamboat on the western rivers was launched at Pittsburgh, and in 1816 the borough became a city. In 1797 the glass industry was established. Impetus was given the growth of the city by the opening of the



THE OLD BLOCKHOUSE

Pennsylvania Canal to this point in 1834, but in 1845 a heavy loss by fire was sustained. In 1851 the first railroad entered the city. During the first great railroad strike in America (1877), the militia at Pittsburgh refused to fire at the strikers, and state troops, with some loss of life, restored order. The original spelling of the city's name was continued until 1911, when the final *h* was added. J.P.C.

Consult Wither's *Frontier Forts of Pennsylvania;* Boucher's *Century and a Half of Pittsburgh and Her People.*

PITTSBURG LANDING, Battle of. See Shiloh, Battle of.

PITTS'FIELD, Mass., the county seat of Berkshire County, is beautifully situated in the heart of the Berkshire Hills, in the northwestern part of the state. It is fifty-one miles northwest of Springfield and fifty miles southeast of Albany, N. Y., on a branch of the Housatonic River and on the Boston & Albany, the New York Central (branch) and the New York, New Haven & Hartford railroads. In 1910 the population was 32,121; this had increased to 41,534 in 1920 (U. S. census). Several villages are included within the city limits, and its entire area is over thirty-four square miles.

Pittsfield is more than 1,000 feet above the sea and is in a region of beautiful hills, valleys and lakes, constituting a favorite residence section. Prominent features of the city are a Federal building, completed in 1911 at a cost of $125,000, a fine white marble courthouse, the Berkshire Athenaeum and public library, the Crane Museum of Natural History and Art, a Y. M. C. A. building, and parks and playgrounds. The leading institutions are the House of Mercy, Hillcrest and the tuberculosis hospitals, the Henry W. Bishop Training School for Nurses and the Berkshire County Home for Aged Women. Pittsfield had 90 manufactories in 1920, which were capitalized at $35,848,000. The value of the products in that year of unusually high prices was over $41,600,000.

The city was settled in 1743 as Pontoosuck, or Boston Plantation. When it was incorporated in 1761 the present name was adopted. It became a city in 1891. Among the noted men who have been residents of the city and vicinity are Longfellow and Oliver Wendell Holmes.

PITTSTON, Pa., in Luzerne County, is a city in the anthracite coal region in the northeastern part of the state. It is ten miles southwest of Scranton, on the Susquehanna River and on the Central of New Jersey, the Delaware & Hudson, the Lehigh Valley and other railroads. There is electric interurban service to neighboring towns. In 1910 the population was 16,267; it was 18,497 in 1920. About thirty per cent of the inhabitants are Irish and forty per cent are Italian, Welsh, Scotch, Polish and Hungarian.

The main business of the city is the mining and shipping of coal. Here also are knitting and silk mills, a paper mill, iron works, stove works, brass works, machine shops and railroad yards. In the vicinity are large clay deposits. The city has Saint John's Roman Catholic Church and convent, a Y. M. C. A. building and a public library. On the opposite side of the river, spanned here by several bridges, is West Pittston, more distinctively a residential town. Pittston, named in honor of William Pitt, was settled about 1770, was incorporated as a borough in 1855, and became a city in 1894. The commission form of government was adopted in 1914.

PI'US, the name of ten Popes, all except one or two of whom won a permanent place in history. Two of them lived within the memory of millions of the world's present population, a fact unusual in the history of the Papal succession.

Pius II, Pope from 1458 to 1464, was known before his accession as AENEAS SYLVIUS. His unusual ability was evident in his youth, and he was employed in several important posts while still a young man. Especially at the Council of Basel in 1431 did he show his powers, succeeding by his reasoning and his oratory in reconciling the Emperor Frederick III and the Papacy. He took priestly orders in 1447, was made bishop of Siena in 1449, and in 1456 received a cardinal's hat. After his election to the Papal chair in 1458 he attempted to organize a crusade against the Turks, but found the old holy enthusiasm hard to rouse. He persisted in his efforts and at last actually assembled a force, of which he himself was to be the head, but he died before the expedition could set sail. A scholar of note, interested in the new learning, he left works which secured him lasting fame.

Pius IV was Pope from 1559 to 1565. In his young manhood he was a lawyer and as such was employed on several important diplomatic commissions, but later entered the Church, becoming archbishop in 1545 and cardinal in 1549. Early in 1562 he reassembled the famous Council of Trent, which continued its sessions until December, 1563, and at its close published as an embodiment of the doctrines defined by it the Creed of Pius IV, which must be accepted by all taking Orders in the Roman Catholic Church, and by all converts. Pius IV was more conciliatory in his attitude toward the Protestants than his predecessors had been.

Pius V, Pope from 1566 to 1572, was born in 1504, in Lombardy. As a member of the Dominican Order from his fifteenth year he distinguished himself by the severity of his life and his asceticism. In 1557 he was made a cardinal, and in the following year he became grand inquisitor for the Roman Catholic world. In 1566 he succeeded Pius IV. He was zealous for reform, and promoted in every possible way the Counter-Reformation. Elizabeth of England was excommunicated by him, and Charles IX of France was encouraged in his measures against the Huguenots. Most important of all his achievements was the formation of the Holy League against the Turks, in which the States of the Church were joined by Spain and Venice. It was this league which so thoroughly defeated the Turks in the Battle of Lepanto, in 1571. Pius V was the last Pope to be canonized.

Pius VI was elected to the Papal chair in 1775, having been made a cardinal two years earlier. The early part of his reign was taken up with disputes with the Emperor Joseph II, who had declared that all the religious Orders within the empire were independent of Papal control. More serious disturbances came later, however, after the outbreak of the French Revolution. During his invasion of Italy in 1797, Napoleon Bonaparte forced from the Pope, who had favored the allies, a treaty giving up certain territory; and in the next year the French entered Rome, proclaimed a republic and took bodily possession of the Pope. He was carried to Siena, to Grenoble, and later to Valence, where he died (see NAPOLEON I).

Pius VII was one of the most important Popes who ever bore this name. He was born at Cesena in 1742, became a Benedictine monk and rose rapidly in the Church until, in 1785, he was created a cardinal. In 1800 he was elected to the Papacy and was allowed to enter Rome, although the city was in the hands of the French. As Napoleon was desirous of restoring religion to its former place in France, an agreement was concluded, and in 1804 the Pope went to Paris and crowned Napoleon emperor. The friendly relations between the two had already been somewhat strained, and after this time they became more so, until, in 1809, Napoleon declared the States of the Church annexed to French territory. The Pope at once issued a bull of excommunication against the emperor, and was in consequence arrested and taken to Savona and afterward to Fontainebleau. After Napoleon's downfall, Pius returned to Rome, and the Congress of Vienna restored to him all the former territories of the Church. During the quiet remainder of his reign he showed himself active in opposition to secret societies and in the reëstablishment of the Jesuits. Pius VII was a man of simple, upright life.

Pius IX was in the Papal chair at the time of the formation of the kingdom of Italy, and was thus the last of the Popes to wield temporal power. He was born at Sinigaglia in 1792, entered the Church in 1819 and by 1827 had risen to the rank of archbishop. In 1840 he was made a cardinal, and six years later, on the death of Gregory XVI, was elected Pope. Before his elevation to the Papacy he had shown liberal tendencies, and his earliest acts as Pope

seemed to promise a liberal and popular government; but the events of 1848 were too revolutionary, and in November of that year he was compelled to flee from Rome, which proclaimed itself a republic. By the aid of the French he was reëstablished, and from that time showed himself strongly conservative.

He opposed the attempted union of Italy under Victor Emmanuel, and refused to yield or to make concessions until, in 1870, the French forces which had defended him in his temporal power were withdrawn, and Rome became the capital of united Italy. The Pope persisted in regarding himself as a prisoner, and shut himself up in the Vatican. Through these troubled times he had bestowed most of his attention upon Church matters, leaving political questions to his legates. He recalled the Jesuits, established anew the hierarchy in England, defined, in 1854, the dogma of the Immaculate Conception of the Virgin Mary, and in 1870 promulgated the doctrine of Papal infallibility.

Pius X (1835-1914), born GIUSEPPE SARTO, one of the most beloved of recent occupants of the Papal throne. His parents lived near Venice, and the family were humble peasants. He studied at Treviso and at Padua, and in 1858 was ordained and made assistant priest at Tombolo. In this, as in his later pastorates, he showed the simple goodness and the sympathy for the poor and oppressed which remained characteristic of him throughout his life. In 1884 he was consecrated bishop of Mantua; in 1893 he became a cardinal and patriarch of Venice, and his able and effective work in that diocese won him election to the Papacy in 1903, upon the death of Leo XIII. During his Papacy the Church was disestablished in France and in Portugal. Pius X was involved in a controversy with the extreme Modernists and issued several letters protesting against the introduction into religious matters of the very radical tendencies of the day. He raised to the cardinalate in 1911 three American archbishops, Falconio, Farley and O'Connell. Pope Pius died on August 20, 1914, his death having been hastened, it is believed, by grief over the outbreak of the War of the Nations. He was succeeded by Cardinal Della Chiesa, who assumed the title of Benedict XV.

Pius XI (1858-), the 261st occupant of the Papal chair, was born ACHILLE RATTI, October 12, 1858, of Italian parentage. He was made a priest at twenty-three and almost at once began to display qualities of mind which marked him for preferment. From his priestly duties he was taken to become Ambrosian librarian at Milan, and was soon transferred to the Vatican Library. He served in the latter position many years, leaving it to become papal nuncio in Poland after the organization of that republic in 1918. In Poland he endeared himself to every class of society by his devotion to the war-torn people, and earned for himself the archbishopric of Milan. He was made a cardinal June 16, 1921, by Benedict XV, and therefore had been enjoying that dignity only eight months when on February 6, 1922, he was elected Pope. From the moment of his elevation to the high office he evinced a democratic spirit.

For the details of the struggle of the Popes for temporal power and its ultimate loss, see POPE; ROMAN CATHOLIC CHURCH. Consult Ady's *Pius II, Humanist Pope;* DeCesare's *Last Days of Papal Rome;* Waal's *Life of Pope Pius X* (translation by Berg); Von Ranke's *History of the Popes.*

PIZARRO, *pi zahr' o,* FRANCISCO (1471-1541), an illegitimate son of a Spaniard, Gonsalvo Pizarro, who rose from obscurity to become a great Spanish explorer and crowned his life work by conquering Peru. In his early years he seems to have had little care and no education. When news came of the discovery of the New World he crossed the Atlantic with Ojeda (1510), with whom he remained several years. Pizarro accompanied Balboa on the expedition which discovered the Pacific Ocean; under another adventure, in 1519, he received a grant of land in Panama and engaged in cattle farming there. A few years later, forming a partnership with Diego de Almagro and Father Luque, he explored the western coast of South America. Pizarro succeeded in landing on the island of Gallo, in face of native opposition, and Almagro returned north for assistance. The governor of Panama sent an expedition to bring the adventurers home, but Pizarro refused to return, and called for volunteers to assist him in the exploration he had determined to make. Thirteen men remained to share his hardships, and they explored as far as the Bay of Guayaquil, returning with proofs of the richness of the country.

Finding the governor of Panama but little interested in his explorations, Pizarro determined to apply to the Spanish king. Arriving in Spain in 1528, he persuaded Charles V to help him, and on July 25, 1529, at Toledo, the famous agreement was signed making Pizarro governor and captain-general of the province of New Castile for 200 leagues along the coast.

In 1530, with a band of followers, including four brothers, he reached Panama, leaving there in January, 1531, for Peru, and landing at Tumbez. Finding the country weakened by the struggle between Atahualpa, the reigning Inca, and Huascar, his brother, the legitimate monarch, Pizarro seized his opportunity and, under pretense of supporting the usurper, was allowed to enter the country. Realizing the danger of advancing far with only 100 men, Pizarro attacked the

FRANCISCO PIZARRO
Drawn from an old painting, now in Madrid.

natives and captured Atahualpa; and though the Inca furnished a large ransom, he was killed on the pretense of being discovered in a conspiracy against the visitors. Meanwhile, Almagro returned to his assistance with 150 more followers; the country was then conquered, and Cuzco was occupied by the Spanish. Lima, the first town colonized by Pizarro, was founded in January, 1535.

The king bestowed on the adventurer the title of marquis, and gave Almagro a grant of land. Pizarro began to develop the resources of the country, but in 1536 the Incas attempted to expel the Spaniards, and while defending Cuzco, Juan Pizarro was killed. Then Almagro claimed Cuzco as part of his territory, and seized as prisoners Pizzaro's brothers Hernando and Gonsalvo. The latter escaped, and Pizarro offered to give up Cuzco if his brother Hernando were liberated. This was agreed to, but Pizarro immediately declared war on Almagro, defeated and captured him; soon the latter was discovered in an attempt to bribe the guards, so he was put to death. Again Pizarro returned to Cuzco, and proceeded to introduce improvements. But the followers of Almagro, supporting the claims of his half-caste son, Almagro the Lad, surprised and mortally wounded Pizarro on June 26, 1541. Making a cross with his blood, he died kissing the emblem. E.D.F.

Consult Prescott's *History of the Conquest of Peru;* Ober's *Pizarro, and the Conquest of Peru.*

Related Subjects. The reader is referred in this connection to the following articles in these volumes:

Atahualpa — Inca
Balboa, Vasco Nunez de — Peru, subhead *History*

PLAGUE, *playg,* a malignant infectious disease, which has caused the death of thousands every year in various parts of the world, for centuries past. It is characterized by eruptions like small carbuncles, following sudden attacks of high fever, chills, headache, lassitude, vertigo and enlargement of the glands in the neck. In many cases the patient dies before the eruptions appear. Often an attack proves fatal in a few hours, but it may continue about ten days, when the patient is liable to succumb through heart failure or exhaustion. In epidemics, the majority of the patients die; when they do survive, recovery is tedious. The cause is a specific microbe, which also infects rats, lice, fleas and other animals, all of which may help spread the disease. In the city of Madras, in India, the plague never has gained a foothold, with the exception of a single epidemic in 1905-1906, although the city has a population of half a million, and the disease has been common in India for centuries. This fact is attributed to the continuous rigid campaign against rodents.

The disease has no specific remedy, but medical experts have often found the injection of serums and prophylactic fluids effective. In mild cases, calomel, antipyrene and stimulants are beneficial. Sanitary precautions in regard to drainage, destruction of rats, and cleanliness in dwellings and streets are the best safeguards, and formaldehyde gas is probably the

best disinfectant. Patients should be isolated a month after apparent recovery.

The first visitation of the plague to Europe occurred at Athens in 430 B. C. One of the most disastrous epidemics of ancient times was that of Rome, in 262, when 5,000 persons succumbed daily. The disease was taken to Europe by the Crusaders in the thirteenth century. From 1334 to 1351, China, India, Persia, Russia, Germany, Italy, France, England and Norway were devastated by the plague, then known as the *black death*. In succeeding centuries the scourge continued to claim its victims, and between 1603 and 1665 London lost 153,849 souls. In Marseilles, in 1720, 60,000 succumbed in seven months, and Moscow was almost depopulated in 1771. Africa and Asia suffered no less than twenty-three epidemics between 1783 and 1844. Constantinople lost 260,000 of its inhabitants in two epidemics (1803 and 1813). New York City was visited in 1899 and San Francisco in 1900, but the disease did not spread.

Consult Blue's *The Post-Mortem Diagnosis of Plague.*

PLAIN, *playn,* a broad, level expanse of land generally rising not more than 1,000 feet above the sea. There is often no line of separation between a plain and a plateau; this is illustrated by the great central plain of North America, where the ground gradually slopes up from the Mississippi River to an altitude of 2,000 feet before it joins the plateau upon which the Rocky Mountains rise (see PLATEAU). Within the United States the great plain is treeless for 500 miles east of the mountains, on account of the dry climate, but in Canada, where there is more rainfall, large forests cover parts of the land. Much of the surface of the plains is covered with a more or less abundant growth of herbage. On this herds of countless buffaloes once fed, but domestic cattle have now taken their place.

Plains are often formed along the seashore, where the waves wash up a great deal of sediment brought down by the rivers, until in the course of centuries a broad expanse of low land is constructed. Such land, called a coastal plain, is found along the borders of various continents and often furnishes splendid soil for raising crops, like that which extends along the Southern Atlantic coast of the United States (see COASTAL PLAIN). Other plains were originally at the bottom of the sea, but as the water receded, the level land was left uncovered, forming large tracts in Northern Africa, Central North America and Siberia. The basins of dried-up lakes often form plains, such as that in the valley of the Red River of the North, where a large lake disappeared after the Glacial period.

Most inland plains have a rich soil upon which abundant crops will grow in favorable weather, and transportation is also a simple problem on the level country; such regions are therefore generally well populated.

Related Subjects. The reader is referred to the following articles in these volumes:

Llanos	Prairie
Pampas	Selvas
Plateau	Steppes

PLAIN'FIELD, N. J., one of the most attractive residential suburbs of New York City and Newark. It is in Union County, in the northeastern part of the state, and is picturesquely located at the foot of a densely-wooded, steep ridge known as First Mountain. Newark and New York are respectively sixteen and twenty-four miles northeast. Transportation is provided by the Central Railroad of New Jersey and by electric lines which operate northeast and southwest from the city. Plainfield has a number of beautiful parks, handsome homes, country clubs and a public library. The Y. M. C. A. building and Muhlenberg Hospital are worthy of note. Although it is chiefly a residential city, the town has a considerable output of manufactured products, which include silk and cotton goods, silver-plated ware, gloves, lumber and foundry and machine-shop products. The first settlement was made in 1684, but the first frame house was not built here until 1735. In 1847 the town was incorporated and in 1867 the city was chartered. The population increased from 20,550 in 1910 to 27,700 in 1920, a gain of 35 per cent. The area is about six square miles.

PLANE, *playn,* a term used to define the simplest of geometrical surfaces—a surface such that the straight line joining any two of its points lies wholly within the surface. It is also defined as a surface which is determined by any three of its points not in a straight line, by a straight line and a point not in the line, or by two intersecting lines or by two parallels. When two planes intersect, their intersection is a straight line. A plane has no curvature. A plane figure is a portion of a plane bounded by lines either straight or curved. If the lines are straight, it is said to be *rectilinear;* if they are curved, it is *curvilinear.* Thus a square is a rectilinear and a circle a curvilinear plane figure.

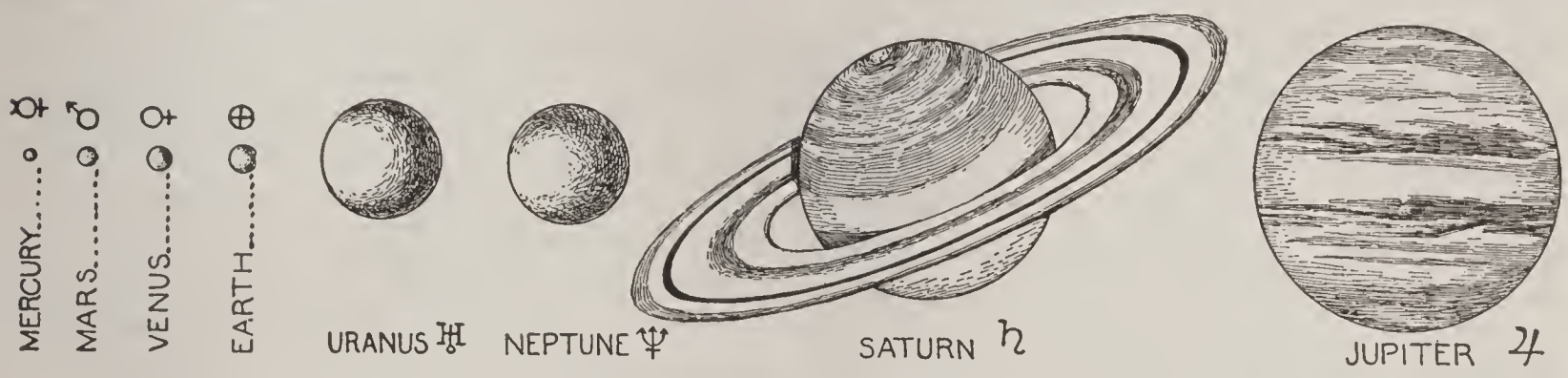
PLAN'ET. Among the glories of the heavens are those so-called bright stars that shine with a steady light. Because of constant changing of position among the stars the ancients called these bodies *planets,* a name meaning *wanderers.* However, by astronomers the planets are not recognized purely as stars. They are bodies which, like the earth, move around the sun in nearly circular paths called *orbits.* Named in the order of their distances from the sun, the planets are Mercury, Venus, earth, Mars, Jupiter, Saturn, Uranus and Neptune. Six of them, Mercury, Venus, the earth, Mars, Jupiter and Saturn, were known to the ancients, but they did not know that the earth was a planet. Uranus was discovered by Sir William Herschel in 1781, and Neptune was located by mathematical calculation; two astronomers, Leverrier and Adams, working independently, located it at the same time.

Venus, Mars, Jupiter and Saturn are easily seen with the naked eye. Mercury is seldom seen because it is so near the sun. Uranus may occasionally be seen under favorable atmospheric conditions, but Neptune can be seen only with a good telescope.

Planets and Stars. Before the invention of the telescope there was no way of distinguishing the planets from the stars except by their brighter light. Therefore the ancients called them stars. But we now know that every one can distinguish a planet from a star with the naked eye. A star always twinkles and a planet shines with a steady light. With a small magnifying glass (a good opera glass will answer the purpose) another distinction may be seen. The planet appears as a full, round disk when seen through the glass, but the star as a mere point of light.

STAR AND PLANET
The difference in appearance of the two, as seen through the telescope.

Size and Distances from the Sun. The planets differ widely in respect to size. Mercury, the smallest, is about one-eighteenth the size of the earth, while it would take over 1,200 earths to make a planet as large as Jupiter. Venus is almost as large as the earth; Mars is only one-seventh the size of the earth. Saturn is 770 times larger than the earth, Uranus sixty-six times and Neptune sixty times larger than the earth. But the amount of matter in a body depends upon both its volume and its density, or mass, and when these factors are considered we discover some very interesting results. For instance, a person weighing 100 pounds on the earth would weigh only thirty-eight pounds on Mars, but if he were to visit Jupiter his weight would increase to 316 pounds. On Mars he could easily jump over a ten-foot fence, but on Jupiter it would be an effort for him to jump across a ditch two feet wide. On Mars he could throw a ball three times as far as he could at home, but when he would reach Jupiter he would need a strong arm to throw it a hundred feet. Since everything on the sun would weigh twenty-seven times what it does on the earth, a man weighing 150 pounds would weigh more than two tons when transported to the sun.



COMPARATIVE SIZES OF THE PLANETS
The characters following the names are the astronomical symbols of the planets.

The distances of the planets from each other increase with their distances from the sun, as may be seen by making computations from the table on page 4696.

Classification. Humboldt classified the planets into two groups—the *terrestrial* and the *major* groups. The first group includes Mercury, Venus, earth and Mars, and was given its name because the earth was one of its members. The group of major planets—Jupiter, Saturn, Uranus and Neptune—was so named because of their great size. But the density of these large planets is much less than that of the smaller planets, each of which has a density about the same as that of the earth. Were Jupiter's weight proportionate to its size a man weighing 150 pounds on the earth

would weigh 215,000 pounds on Jupiter; that is, he would be heavier than a locomotive. Another distinction between the planets in these groups is that those of the terrestrial group shine by reflected light, while there is evidence that those of the major group emit some light of themselves. Between the terrestrial and major planets is a great space in which are found a large number of small planets called *asteroids,* or *planetoids.*

Movements of the Planets. Every planet has two motions—a revolution around the sun and a rotation on its axis. The time required for a complete revolution in its orbit constitutes the year, or period, of the planet; the time required for its rotation constitutes its day. Because of their smaller orbits the terrestrial planets have shorter years than those of the major group, but the major planets rotate on their axes more rapidly than the smaller ones. Jupiter's day, for instance is less than one-half of our day.

The table on this page gives the distance of each planet from the sun, the length of its year and its diameter, in round numbers. In measuring distance from the sun the earth's distance is taken as the unit. F.ST.A.

NAME	DISTANCE IN ASTRONOMICAL UNITS	YEAR OR PERIOD	DIAMETER
Mercury	0.4	3 months	3000 miles
Venus	0.7	7½ months	7700 "
Earth	1.0	1 year	7918 "
Mars	1.5	1 yr. 10 mos.	4200 "
Asteroids	3.0	3 years to 9 years	500 to 10 miles
Jupiter	5.2	11.9 years	86,000 miles
Saturn	9.5	29.5 "	73,000 "
Uranus	19.2	84.0 "	32,000 " ?
Neptune	30.1	164.8 "	35,000 " ?

Related Subjects. For further information and more detailed description, the reader is referred to the following articles in these volumes:

Asteroids	Neptune
Astronomy	Satellite
Earth	Saturn
Jupiter	Solar System
Mars	Star
Mercury	Uranus
Nebular Hypothesis	Venus

PLANETOID, *plan'et oid,* one of many small planets usually called *asteroids,* revolving about the sun between the orbits of Jupiter and Mars. About 500 planetoids have been discovered and it is considered that their number is almost countless, though their small size renders them invisible. See ASTEROIDS.

PLANETESIMAL HYPOTHESIS, *plan e tes' i mal hi poth' e sis.* See NEBULAR HYPOTHESIS.

PLANE TREE, a species of tree which grows to giant size, easily recognized by its smooth bark, which flakes off, exposing the white layer beneath and giving the tree a mottled, whitewashed appearance, and also by its seed balls, strung like beads, three or four upon each long stem. It received its name (from a Latin word meaning *broad*) because of its wide leaves. The European species is gaining popularity as a shade tree in America, where others of the family, the *buttonwood,* or *buttonball,* and *sycamore,* grow extensively. In ancient times the Greeks admired and worshiped the plane tree, pouring wine upon its roots and festooning its branches with jewelry. The story is told that Xerxes once stopped his vast army for several days to feast his eyes upon a particularly beautiful specimen, and afterwards had a gold medal engraved with a picture of it. Giant plane trees with trunks over forty feet in diameter and thought to be 4,000 years old may be seen in Europe; these are venerable relics of a past age which are slowly falling into decay. The strong wood of this tree is used in making boxes, crates and butcher's blocks.

PLANING MACHINE, an adaptation of the principle of the ordinary hand plane to machinery for planing or smoothing wood and metal. It is usually operated by steam or electricity, power being transmitted by belts and shafting. As used for planing wood it consists of a drum with cutters attached, rotating on a horizontal axis. The wood to be planed or smoothed passes underneath the drum.

In metal planers the object to be smoothed is fixed to a traversing table and is moved against a stationary cutter. Planing machines for metal, or planers, as they are generally called, are of various kinds and are usually named according to the articles they are intended to plane, as *nut planer, rod planer, plate-edge planer,* etc. In shipbuilding yards planers are used with sufficient cutting power to remove large strips from the thickest and strongest armor plate made.

PLANT, any living thing which is not an animal. To define a plant as "any member of the vegetable kingdom" is to move in a circle, for the vegetable kingdom can only be defined as "the general name given to all plants." The exact dividing line between animals and plants the most skilful scientist has never been able to draw, so simple are the lowest forms of both. Almost anyone, if asked suddenly to give the distinction between a plant and an animal, would probably say "An animal can move; a plant cannot." But a little thought shows that that is not a true distinction. Many animals among the lower forms, such as the adult sea squirts, remain fixed all their lives, while, on the other hand, many plants move without the help of any outside agency. For instance, the sensitive plant closes its leaves if they are touched; the Venus's-flytrap shuts upon an intruding insect as unfailingly as a horse moves its ear to drive away the troublesome fly; and the tendrils of any climbing plant coil about the nearest support. About all that can be said definitely is, as one author puts it, that "most animals move more freely than do most plants."

In the article ANIMAL are discussed the chief differences between plants and animals—the different gases which they take into their "lungs," their methods of digesting food and, very important indeed, their choice of food. In this last-named respect it may almost be said that the plant is intermediate between the mineral and the animal kingdom, for it can take up and use mineral matter directly, while most animals live wholly upon other organisms.

Widespread Distribution of Plants. Few are the places, either on land or in the shallower waters, where plants of some sort do not occur. The presence of hot lava, excessive deposits of salt or alkali, or long-continued extremes of heat and cold are almost the only conditions which make it impossible for plants to live. Of course they are not equally numerous everywhere, nor have they much resemblance under widely-differing conditions. The dusty, scattered sagebrush of the western deserts is as truly a form of growing plant life as is the most luxuriant hardwood tree of the tropical forest; it has learned to adapt itself to the unfavorable conditions under which it finds itself. The cactus, also a resident of the desert, has thick, juicy leaves which store up moisture and enable it to live for long seasons without rain, just as the camel's peculiar stomach structure permits it to go for days without drinking. Plants that live in very cold regions, like some of the pines, have developed narrow leaves which present little surface to the frosty air, and which have, moreover, hard protecting coverings. Infinite is the variety of these special forms that have developed among plants to fit them for special conditions of life, and no phase of botany is more interesting.

One branch of the subject of plant life concerns the everywhere-present and generally obnoxious class of plants known as weeds. It might appear that these pests are lower in the scale of development than the beautiful and useful plants of the garden, but such is not the case. On the contrary, it is simply because they are so highly developed that they are able to adapt themselves to all sorts of conditions and to thrive without care.

Importance of Plants. In general, the value of plants is so obvious that it would seem unnecessary to refer to it, but only on examination is it evident just how important they really are. Directly or indirectly, every animal in the world is dependent upon plants for

food. The grazing animals and those that live upon roots, leaves or any other parts of plants are immediately dependent, but even the flesh-eating animals owe their life to plants, for it is on plants that their prey is fed.

And man no less, in one or the other of these fashions, derives all his food from plants, and this fact demonstrates that farmers and gardeners are really the most important members of human society. A thoughtful glance at what is served at dinner will show this in interesting fashion. Perhaps there is a vegetable soup. It contains carrots—a root; tomatoes—a fruit; onions—a stem; parsley—a leaf growth; and rice—the seeds of a grass. The bread, too, is made from seeds; the dressing for the salad is of olive oil and a vinegar which may be traced back to the juicy apple; the sugar, the flavoring in the pudding, and even the after-dinner mints, are direct plant products, while the steak could never have been produced had there not been a good growth of grass on which beef cattle could feed. Of all that is on the table salt alone is not, in one way or another, due to plants.

After dinner the crackling fire in the grate is either of logs straight from the forest or of coal which is the product of long-ago forests; and the paper on which the pleasing book is printed is no less traceable to plants than is the fragrant cigar. Further tracing of the uses of plants is unnecessary here—the reader will find pleasure in examining the common things about him and determining for himself just how many of them at one time grew in field or forest.

Evolution of Plants. Scientists no longer believe that every variety of plant was brought into the world separate and distinct from every other variety; to plants as well as to animals they apply the doctrine of evolution (which see). That is, they believe that all plant forms, however complex, have developed through unnumbered ages from the simplest one-cell forms. First to emerge from the single-cell life, they believe, were the algae, and from them the liverworts developed and the fungi degenerated. Out of the liverworts arose the mosses, from them the ferns, and from the ferns, finally, the flowering, or seed, plants. Incredibly slow was the process, and by no means all of its steps have been traced, but enough has been learned from fossil and intermediate forms to convince most students and to silence the chorus of denial which arose when the great Charles Darwin first announced his theory of evolution. The process of growth and change still goes on, though too slowly to be visible, and man with all his study and with all his plant breeding has not been able to assist in it materially. He has made fruits, flowers and seeds larger; he has taken the seed from the orange, the thorn from the cactus, but he has not been able to develop a single new plant organ. No plant produces seed through the agency of man which did not do so before he experimented with it. The earliest-known wild rice had tiny, unpalatable seeds, while the rice of to-day has a vastly enlarged and improved seed which furnishes food to millions of people; but the little first seed was just as capable of producing new plants as is the developed seed, and that is the main function of a plant—to reproduce itself.

Plant Parts. Not all plants have "evolved" far; that is, not all of them have special organs for accomplishing their purposes. In some all the life processes are carried on in a single cell. But the best-known plants have those highly developed organs, roots, stem, leaves, flowers and fruits, in which are the seed. The roots hold the plant in place and absorb from the soil water and food; the stem supports the leaves and blossoms and carries the sap from the roots to the upper parts of the plant; the leaves absorb carbon dioxide, give off oxygen and in some way not yet clear change the raw food materials into such form that they are of use to the plant; the flower produces the seed and the fruit, the chief purpose of which is to contain the seeds. A.MC C.

Related Subjects. The following list does not contain all the plants which are treated in these volumes, for many of them are classified under the topics here indicated. The article BOTANY, also, which should be read in this connection, includes a list of more general topics which bear a close relation to plant study in some of its very numerous phases.

Carnivorous Plants (with list)
Flowers (with list)
Fruit (with list)
Grains
Grasses (with list)
Medicine and Drugs (with list)
Nut (with list)
Tree (with list)
Vegetables (with list)

CREEPERS

Ivy
Lysimachia
Smilax
Virginia Creeper
Wandering Jew

DESERT PLANTS

Aloe
Cactus
Century Plant
Mesquite
Prickly Pear
Sagebrush
Yucca

FORAGE PLANTS

Alfalfa
Blue Grass
Clover
Gama Grass
Millet
Tare
Timothy
Vetch

SHRUBS

Acacia
Bramble
Broom
Eglantine
Elder
Hawthorn
Heath
Holly
Honeysuckle
Labrador Tea
Laurel
Lavender
Lilac
Maté
Myrtle
Rose
Snowball
Spiraea
Sumac
Syringa
Tea

TROPICAL PLANTS

Betel
Cassava
Cassia
Cineraria
Mango
Mangrove

UNCLASSIFIED

Aruni
Bittersweet
Black Haw
Bloodroot
Brake
Buckwheat
Chicle
Chicory
Cockscomb
Colocasia
Cotton
Cow Parsnip
Cress
Dock
Dodder
Elecampane
Endive
Ferns
Feverfew
Flax
Fleabane
Gromwell
Hemlock
Hemp
Holy Spirit Plant
Hops
Horse-radish
Houseleek
Iceland Moss
Irish Moss
Jack-in-the-pulpit
Jericho Rose
Juniper
Lettuce
Lichens
Licorice
Linnaea
Liverworts
Lungwort
Lupine
Madder
Maidenhair
Mallow
Mandrake
Marsh Mallow
Melilot
Mistletoe
Mold
Mosses
Mullein
Mushrooms
Mustard
Nettle
Nightshade
Pampas
Poisonous Plants
Purslane
Rhubarb
Rusts
Safflower
Saxifrage
Sensitive Plant
Shamrock
Sisal
Slime Molds
Slipperwort
Sloe
Snapdragon
Snowdrop
Spinach
Squill
Star of Bethlehem
Teasel
Trefoil
Truffle
Valerian
Welwitschia
Wistaria
Woad
Wormwood
Yam

PLANT PRODUCTS

Balm, subhead
  Balm of Gilead
Balsam
Bark
Bird's-eye Maple
Calabash
Camphor
Canada Balsam
Caper
Chocolate
Cork
Ebony
Gamboge
Ginger
Ginseng
Goosefoot
Gourd
Gum, and subhead,
  Chewing Gum
Gum Arabic
Gum Resins
Gutta-percha
Jumping Bean
Lac
Lancewood
Lumber
Mahogany
Myrrh
Nicotine
Nut
Opium
Orris Root
Peruvian Bark
Raffia
Rattan
Resins
Rosewood
Rosin
Sago
Sandalwood
Spice
Straw
Tragacanth
Turpentine

PLANT, MORTON F. (1852-), one of the leading men of the United States in railroad and coastwise transportation. He was born at New Haven, Conn., the son of Henry B. Plant, founder of the Southern Express Company. After receiving his education at Russell's Military School, he began his business career in 1868, working in his father's firm at Memphis, Tenn. Sixteen years later he became vice-president of the Plant system of railroads, which had been organized by his father. In 1902, when the system became a part of the Atlantic Coast Line company, he was made a director; also, as vice-president and director of the Peninsular and Occidental Steamship Company, he has vastly extended the lines of transportation. He is a director of the New York, New Haven and Hartford Railroad and chairman of the board of directors of the Southern Express Company.

PLANTAGENET, *plan taj' e net,* a surname derived from the words *planta gesta,* meaning *branch of broom,* and applied to Geoffrey, Count of Anjou, founder of the Plantagenet family, because of his wearing a branch of broom in his cap. Fourteen English monarchs bore this name, from 1154 to 1485. The family was divided into the York and Lancaster branches in 1400, the former known as the *White Rose,* the latter as the *Red Rose.* The House of Tudor was founded by their union in 1485.

Consult Hall's *Court Life Under the Plantagenets.*

Related Subjects. The reader is referred in this connection to the following articles in these volumes:

England, subtitle *History*
Lancaster, House of
Roses, Wars of the
Tudor
York, House of

PLANTAIN, *plan' tin,* a genus of low-growing herbs, several species of which are common

weeds. The *common,* or *greater,* plantain, which gardeners find so troublesome, may be recognized in the spring by its rosette of broad, light green leaves, which spring from the roots. From the center of the leaf clusters are sent up tall, slender spikes, densely covered, all summer long, with tiny green flowers (see illustration). This weed is spread by the birds, which eagerly feast on the seeds and help to scatter them about. The seeds are also fed to cage birds. Other well-known species are the *rib grass,* with narrow leaves and short, thick spikes, and the *seaside plantain,* the leaves of which are used to allay inflammation.

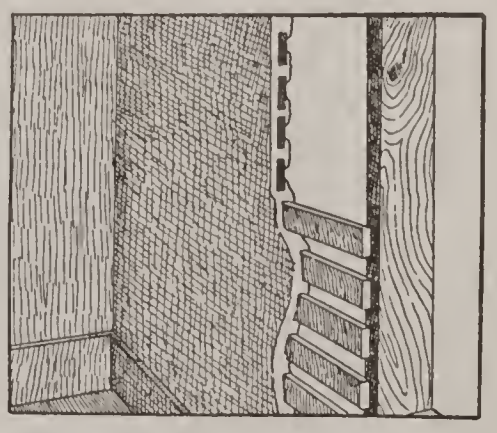
THE PLANTAIN
(*a*) Fruit; (*b*) cross section of fruit; (*c*) flower.

There is also a tropical plant of this name, considered by some authorities as a species of banana. The fruit closely resembles the banana, and though not so sweet nor so pleasing in flavor as the latter, it forms one of the chief articles of food in tropical countries.

PLANT LICE. See APHIDES.

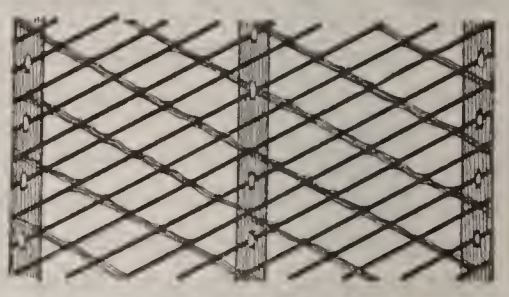
PLANTS, DISEASES OF. See DISEASE, subtitle *Diseases of Plants.*

PLAS'TERING, the process of covering the skeleton of a wall with mortar or other plastic material to give it a uniform surface, to serve for warmth and as a foundation for decorative features, as wallpaper, paint or calcimine. The usual *lath and plaster* method for interior walls is described below; exterior work is ordinarily classed as *stucco* (which see).



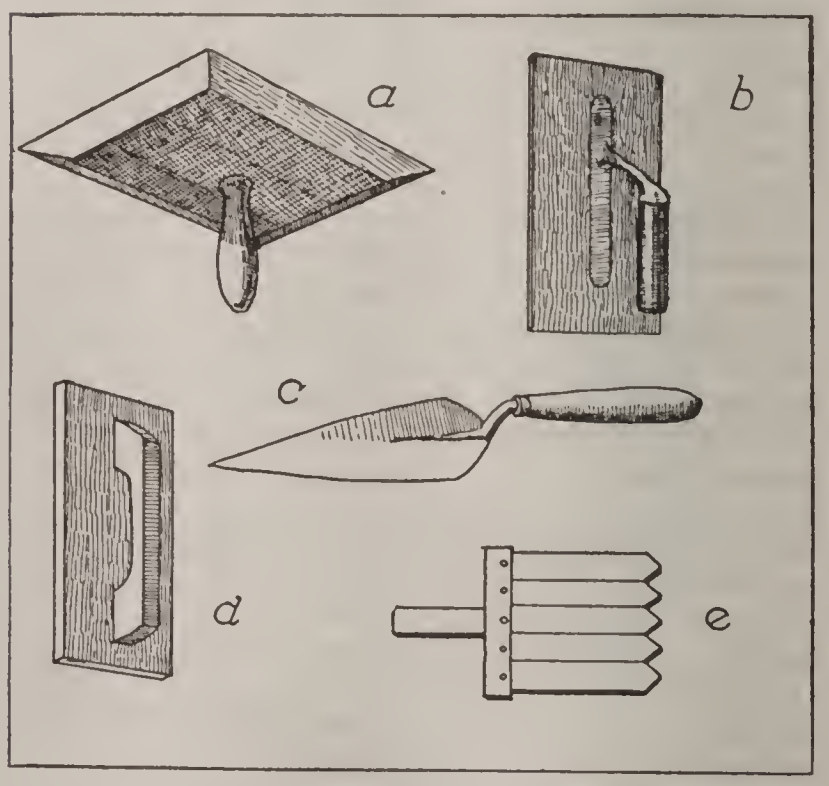
LATH AND PLASTER
The laths are one and one-half inches wide, and should be set at least one-fourth inch apart. In the illustration the upper laths are supposed to have been sawed, to show how the plaster is "keyed" behind them.

The wall to be plastered is first covered with thin, narrow strips of wood, called laths, with spaces between them to allow the plaster a firm grip, or hold, or in fireproof structures by a netting called metal lath. There are usually three, sometimes only two, coats of plaster. For the first, called the *scratch coat,* a mixture of sand and lime, with some horsehair or long oxhair added to make it hold together, is spread thickly over the laths with a trowel. The intervening spaces are carefully filled, and when hardened the plaster is scratched diagonally so that the second coat may have what is called a good *key* to cling to. The second, or *brown* coat, of finer material, usually consists of slacked lime generally without hair. This coat is carefully rubbed in with a flat board, and then plumbed or leveled. It should not be applied until the first coat is thoroughly dry, or the excess of moisture may cause the lath to swell and bend. The final, or *finishing* coat, is applied to the second coat when that also has become perfectly dry; this is only about one-eighth of an inch thick. For moldings or fine work the finishing coat is usually of pure lime mixed with plaster of Paris or marble dust.



METAL LATH

In all plastering, except when the work is to be of the roughest kind, the selection of suitable sand and addition of the right proportion of lime and hair are of great importance and



A PLASTERER'S TOOLS
(*a*) Hawk, on which he holds mortar; (*b*) trowel, for laying plaster; (*c*) trowel, for work in corners, etc.; (*d*) float, for smoothing and plumbing; (*e*) comb, used to roughen the scratch coat.

demand considerable experience. Plastering with cement is conducted in a similar manner to lime plastering, but has to be done more quickly, as cement dries and becomes unworkable much sooner.

Estimating Costs. Ordinary plastering is paid for by the square yard, and in measuring for it no deduction is made for window or door spaces (unless they are very large) nor for ordinary baseboards. Thus the amount of plaster in a room fourteen feet long, twelve feet wide and eight feet high would be computed as follows:

Distance around room, in feet, 12+14+ 12+14=	52
Multiply by height, in feet	8
Area of walls, square feet	416
Add ceiling, 12 ft.×14 ft	168
Total area to be covered, square feet	584
Reduce to square yards (divide by 9)	64⅞

Consult Richey's *Building Mechanics Ready Reference;* Eckel's *Cements, Limes and Plasters;* Miller's *Plastering, Plain and Decorative.*

PLASTER OF PARIS. If gypsum is ground and then baked to drive off the water, a fine dry powder, called plaster of Paris, is formed. From mixing one part of this powder with two parts water a thin paste results, which hardens quickly on exposure to the air. This property of plaster of Paris makes it valuable for casts and for stuccowork, and it is extensively used for both purposes. By adding a small quantity of lime to the paste a very hard substance resembling marble is produced. Under the name of *calcine plaster* this mixture is often used to cement lamps to their sockets and for fastening fixtures in place where screws and bolts cannot be used. See GYPSUM; STUCCO.

PLATA, *plah'tah,* RIO DE LA, the estuary, or funnel-shaped bay, formed by the Parana and the Uruguay rivers on the southeastern coast of South America. A great volume of water flows into it from these two rivers, creating a powerful current, and there are many treacherous shallows; navigation is therefore very dangerous all along its extent of 200 miles. Not far from the mouth, which is 143 miles wide, lies the good, natural harbor of Montevideo, Uruguay, while on the Argentine side massive docks are being built and deep channels are being dredged at Buenos Aires and La Plata. The estuary was discovered by Diaz de Solis in 1516, but was given its present name, which means *silver river,* by Sebastian Cabot.

PLATEAU, *pla toh',* an elevated plain formed in a mountainous region by the uplifting of great sections of horizontal strata. Plateaus owe their formation to the same movements that created the mountains. The distinction between a plateau and a plain (which see) is chiefly one of altitude, the latter being generally not more than a thousand feet above sea level. Plateaus are also more rugged, and, because of their higher altitude, their streams cut deeper valleys than do those of plains. These valleys may take the form of huge gorges, such as the famous canyon in Arizona (see GRAND CANYON OF THE COLORADO). Sometimes a plateau is so carved by Nature's sculptors, wind and water, that it takes on the appearance of a range of mountains. This is true of the Catskills in New York, for these beautiful hills are really a part of the Alleghany plateau (see CATSKILL MOUNTAINS).

In North and South America the higher plateaus are on the western side of the continents, and the lower ones on the eastern side. A plateau about a mile and a half high lies between the Rockies and the Sierra Nevadas in North America, and one in Bolivia, South America, is bordered by the giant peaks of the Andes. The loftiest plateaus on the earth are found in the Himalaya regions of Central Asia —"the roof of the world" (see PAMIR; TIBET). In regions where there is little rainfall smaller flat-topped areas are often found rising from the main plateau. Such formations, called *mesas,* are the work of erosion (see MESA; EROSION). Economically, high plateaus are of little value to mankind because their ruggedness makes commercial intercourse difficult or impossible, and climatic conditions are not favorable to the support of any considerable population. Those of lower altitude are sometimes excellent grazing grounds for sheep and cattle. Such areas are found in Western United States and in the western part of Australia. The plateaus of the Appalachian regions in Eastern United States have valuable deposits of coal and iron.

PLAT'INUM, the most valuable of all the precious metals, worth literally its weight in gold. Its name, which is derived from the Spanish word *platina,* the diminutive of *plata,* meaning *silver,* was given to it by the Spaniards because the ore which contains this metal resembles silver. This ore, which was first discovered in Peru about the middle of the eighteenth century, is called native platinum, and is usually found in beds of gold-bearing sands. The miners call it white gold. It occurs mostly in small, irregular grains, which contain several rare metals, such as iridium, osmium, rhodium,

palladium and ruthenium, in addition to a little iron, copper, chromium and titanium. Occasionally large nuggets of native platinum are found. The ore contains from sixty to eighty-five per cent of pure platinum.

Production and Distribution. The world's output of platinum averages about 300,000 ounces a year. About eighty-five per cent comes from Russia, where the ore is found in the Ural Mountains. The next largest supply comes from Colombia, in South America. It is also found in very small quantities in Canada, Australia, New Zealand and the islands of Borneo and Sumatra. From the gold-bearing deposits of California, Oregon and Nevada about 600 ounces are extracted a year. Besides this a considerable amount is extracted in the United States in the process of refining gold and copper. From this source 3,100 ounces of pure platinum were produced in 1916.

Properties. Platinum is a chemical element (symbol Pt). It is grayish-white in color and is one of the heaviest substances known, its specific gravity (see GRAVITY, SPECIFIC) being 21. It is highly malleable and ductile (see DUCTILITY; MALLEABILITY) and in these properties is surpassed only by gold and silver. It melts at the high temperature of 3200° Fahrenheit.

Platinum is not oxidized in the air, and it is not attacked by any of the pure acids. It dissolves only in *aqua regia* (which see) or nitro-muriatic acid and in mixtures which generate chlorine. Platinum combines directly with phosphorus, arsenic, silicon and with almost all other metals. It forms useful alloys with gold, silver, steel and iridium. See ALLOY.

Uses. On account of its power of withstanding heat and the action of chemical reagents, platinum is much employed as a material for making vessels and crucibles which are used in chemical laboratories and in many chemical industries. It also fills an important place in the manufacture of sulphuric acid, where it acts as a catalyzer, that is, as a substance which by its presence helps the chemical combination of other elements. Platinum is valued by makers of expensive jewelry, for it is considered to be the best setting for precious gems, and dentists employ it in the teeth. The alloy of platinum with iridium, a rare metal of the same group, possesses an excellent and unalterable surface for fine engravings. The standard units of weights and measures are made from this alloy.

Consult Rose's *The Precious Metals, Comprising Gold, Silver, and Platinum.*

PLATO, *pla'toh* (427-347 B.C.), one of the greatest of Greek philosophers, was born on the island of Aegina, belonging to Athens. His father was Ariston, a descendant of Codrus; his mother, Perictione, was said to have been of the line of Solon. In his youth he received the customary education of the age, and tradition states that he wrote poetry and won distinction in gymnastics; also, that through the influence of Socrates he turned to philosophy at the age of twenty. Without positive basis of truth it is also said he traveled extensively in Greece, Sicily, Italy, Egypt and Northern Africa; and that Dionysius of Syracuse sold him into slavery at Aegina, though friends rescued him immediately. In 387 B.C. he was in Athens, and there established his school, the "Academy," on an estate one mile from the city. The last years of his life are wrapped in obscurity, and the numerous legends regarding him have been almost entirely discredited.

There is no evidence that any of Plato's writings have been lost, but many formerly accredited to him are now regarded as not his. His works are all in the form of dialogues, in which he attained unparalleled depths of beauty, truth and grace. The important ones include *Laches, Charmides, Lysis, Protagoras, Io, Meno, Euthyphro, Apologia, Crito, Phaedo, Symposium, Phaedrus, Cratylus, Gorgias,* the *Republic;* the dialectical or argumentative dialogues *Timaeus, Critias* and the *Laws.* The *Euthyphro, Apologia, Crito* and *Phaedo* refer especially to the trial and death of Socrates, who appears in each of them as the man of ideal piety, the reformer, the law-abiding citizen, the recluse dwelling on eternal themes.

His greatest work is the *Republic,* in which are outlined plans for an ideal State. Its purpose was to be the training of citizens to become virtuous; its aim, the true happiness of the individual. Although Plato realized that this ideal commonwealth could never be attained in an imperfect world, he constantly held it up as an end toward which all should strive. In it each human soul would be best fitted for its proper work. The citizens would be divided into three classes, according to the three dominant virtues of the soul—the governing class (whose virtue is wisdom); the military (valor); the industrial (self-restraint and willing obedience). Art, the Beautiful, and all other things would be subordinate to the Good.

It is practically impossible to formulate Plato's system of philosophy in a few sentences. An eighteenth century writer thus summarizes

it, and his view accords with twentieth century thought:

> Platonism appears as the most Greek of all philosophies, since it does not, like the Ionian and Eleatic doctrines that preceded it, reflect merely a single peculiarity of a single stock, but has included within itself all previous philosophy and reflects the Greek spirit as a whole.

It falls naturally into three classes: dialectics (or logic), physics and ethics. It became an idealistic, rather than a realistic, theory of things. He accepted Socrates' doctrine of virtue, that virtue is dependent on knowledge, and that truth and the good exist inseparably. From a study of the particular virtues, he rose to a conception of virtue in general. The moral ideal becomes the one, the good, the true. Individual things are fleeting; the general idea alone is permanent. The tree, the man, the flower pass away and change; the general concept—tree, man, flower—however, remains unchanged. The general concept, or *Idea,* therefore alone has true *being.*

Reasoning thus, he formulated his celebrated doctrine of Ideas. Just as there is a material world known through our senses, so there must be another, or "other," world of our ideas, of which we cannot gain any knowledge through our perceptions. Thus are the claims for an "immaterial reality" consciously and fully expressed, and a doctrine of Idealism expounded that became one of the most fruitful and forceful processes of all European thought. And through it all run the two persistent threads: "Reason guiding will is the supreme factor," and "There is identity between the true and the good."

With Plato all of Greek thinking reached the very height of its development. With him for the first time philosophy had its realization, and the whole natural and spiritual world were reconstructed scientifically in accordance with philosophical principles. His influence on Aristotle (his immediate successor), the Stoics (see STOICISM), Plutarch, the Christian fathers, the writers of the Renaissance and the whole of modern thought has been permanent and far-reaching. M.A.H.

> The student of Plato will do well to read in these volumes such articles on philosophy as CONCEPT, PERCEPTION, REASON. Consult, also, Shorey's *The Unity of Plato's Thought;* Pater's *Plato and Platonism.*

PLATT, THOMAS COLLIER (1833-1910), an American political leader, long a prominent figure in the Republican party. He was born at Owego, N. Y., was educated at Yale, and before he entered political life was a druggist and president of the Tioga National Bank. His political career began with his election in 1859 as clerk of Tioga County; in 1872, after he had become the political friend and ally of Roscoe Conkling (which see), he was elected to Congress. In 1881 Platt was elected United States Senator, but shortly afterwards both he and his colleague, Senator Conkling, resigned, because President Garfield would not follow their wishes in making appointments. The New York legislature failed to reëlect them, but Platt, who had gained control of the New York Republican organization, regained his seat in the Senate in 1897 and was reëlected.

PLATTDEUTSCH, *plat'doich,* **LOW GERMAN,** or more correctly, **LOW SAXON,** is the language spoken in the lowlands of Northern Germany. This territory reaches from the boundary of Holland eastward to that of Russian Poland, and comprises about one-third of the German Empire. Plattdeutsch differs from High German less in its inflections than in its consonant sounds, and the use of *ik* in Low German in the place of the High German *ich* (I) is so distinctive a feature that the general boundary between High German and Low German territory is often spoken of as the *ich-line.* Plattdeutsch is more like the Dutch of the Netherlands and like English than is the High German.

Previous to the beginning of the seventeenth century Low German was the literary language as well as the vernacular, or common tongue, of Northern Germany. Epics, ballads, and many religious treatises and hymns were written in it, and a Low German Bible existed before the first translation into High German was begun. Gradually the language of the southern German states became dominant, owing largely to the immense popularity of Luther's version of the Bible, and Plattdeutsch became merely the everyday language of the people. The last Low German Bible was printed in 1621.

To-day High German is the language of the schools, the government, and in the main of the educated classes. Among the people of North Germany as a whole, Plattdeutsch persists, but words and contributions are constantly being borrowed from the High German, so that the character of the common speech is gradually changing. Interest in Low German is increasing among scholars, as it affords excellent means of investigating the history of the German language.

See PHILOLOGY; GERMAN LANGUAGE.

PLATTE, *plat,* the most important river of Nebraska and one of the largest tributaries of the Missouri. It is formed by the union of two branches—the North and the South Platte—each of which has its source in the mountains of Northern Colorado. The head of the main stream is in Lincoln County, in Western Nebraska. From that point the river flows in a general easterly direction across the state, emptying into the Missouri at Plattsmouth. The length of the North Platte, the longer of the two branches, is about 650 miles, and of the main stream, over 200 miles. The region drained by the river and its branches is about 84,600 square miles, included in which are some of the best irrigated sections of Colorado and Nebraska. Navigation on the Platte is of no importance because the stream is shallow.

PLATTSBURG, *plats' burg,* N. Y., the county seat of Clinton County, situated in the northeastern part of the state, in a region of much historical interest and now popular as a summer resort. The city is situated at the mouth of the Saranac River, on the west shore of Lake Champlain. Albany is 168 miles southwest and Montreal is seventy-four miles northwest. Cumberland Bay, an arm of the lake, forms an excellent harbor. There are steamers to Burlington, Vt., and other lake and river ports; railway transportation is provided by the Delaware & Hudson Railroad. The population, which in 1910 was 11,138, was 10,909 in 1920, a slight decrease. The area of the city is four and one-half square miles.

Prominent features of Plattsburg are a state normal school, a Federal building, Y. M. C. A. building and Trinity Park. There are several public libraries, hospitals, and homes for aged women and for children. South of the city are Plattsburg Barracks, a finely-equipped United States military reservation, where a national training camp for soldiers has been established. At Cliff Haven, still farther south, is the Catholic Summer School of America. The exports of this port were valued at about $32,000,000 in 1915, and the imports, about $28,000,000. Coal, lumber, iron ore and agricultural products are the chief articles of trade. The leading industrial establishments are pulp and paper mills, machine shops and a foundry, and manufactories of brooms, shirts, sewing machines, typewriters and children's clothing.

A colony from Long Island and Poughkeepsie, under the leadership of Zephaniah Platt, settled on this site in 1784. The town was incorporated the following year, and it became a city in 1902. In 1776, off Valcour Island in the vicinity, was fought the first naval battle of the War of Independence, and in 1814 Commodore Macdonough and General Macomb here defeated British sea and land forces. In commemoration of the latter event, the Federal government and the state have created a fine park near the mouth of the Saranac River, on Lake Champlain. In it stands a memorial monument, a granite shaft 120 feet high surmounted by a huge bronze eagle. G.S.N.

PLAUTUS, *plaw' tus,* Titus Maccius (about 254-184 B. C.), the greatest comic poet and dramatist of ancient Rome, was born at Sarsina, a village of Umbria. Little is known definitely of his early life, except that he probably went to Rome while a youth and there was first employed in some unknown capacity in a theater. Later he left Rome, setting out on a business venture, but soon returned penniless, when he was forced to earn his living by turning a hand mill for a baker. While thus employed he wrote three plays and their sale enabled him to forsake the drudgery of his work and enter upon a literary career. This was in 224 B. C., and for forty years he continued to write plays which delighted not only enthusiastic playgoers but the literary critics as well.

He is said to have written 130 plays, at least; of these only twenty are now extant, and it is even uncertain that he was the author of all of these. He borrowed heavily from Greek comic drama, but his own distinct contributions to literature were the development of the lyrical element, the vigor of his character delineation and the emphasis on national (Roman) elements in his humor and in the life he portrayed.

The best known of his plays, and the one which has been most freely imitated, is his *Miles Gloriosus,* whose hero is the boasting coward who is finally exposed—a popular character for comedy of later centuries. Among the other plays generally associated with his name are *Amphitruo, Aulularia, Bacchides, Casina, Cistellaria, Menaechmi, Mercator, Stichus, Persa* and *Vidularia.*

Later dramatists, even the greatest of them, have found much in the comedies of Plautus to imitate. His *Amphitruo,* for instance, is a laughable presentation of twin brothers whose resemblance leads to all sorts of ludicrous mistakes. This play is of special interest to English readers because it formed the basis and furnished more than a hint as to the working out of Shakespeare's *Comedy of Errors.*

PLAY. The word *play* has a number of meanings, each depending upon the way in which it is used. We speak of playing games, of playing on a musical instrument and of a dramatic composition as a play. When applied to machinery play means freedom of movement, or operation without friction. This article is restricted to discussing the play of children. Used in this sense play means action without special aim, or for amusement.

Play is regarded from various viewpoints, each radically different from the others. Among them, the four theories accorded the widest acceptance are these:

1. Play is the result of surplus energy of mind and body, typical of healthy childhood.
2. Active physical exercise is necessary for growing bodies; taken in moderation it reacts favorably on the mind. In childhood this exercise is obtained through play.
3. Play affords the means for the development and direction of man's many complicated instincts which are undeveloped.
4. Play is the medium by means of which the habitual activities of our ancestors are transmitted to us.

Necessity of Play. Doubtless there is more or less truth in all these theories, but the average adult considers play as a means of recreation. The business man plays golf to give him needed physical exercise and to get his mind away from the cares of his office. If he sees his young son and several other children playing at hide and seek he thinks they are doing it for recreation, too, thus attributing to the child the same motives for play as lead him to seek recreation on the golf links. A moment's thought will convince us that this position is not correct. The child does not play because he is weary and needs diversion, neither is he engaged in the game of hide and seek for the exercise derived from it. He plays merely for the sake of playing. He has no other purpose. But he is responding to an instinct that is vital to his full development. "Play is not a luxury, but a necessity; it is the serious business of a child's life; indeed, for young children it is life itself!" This statement from an eminent authority leads us to consider what play does for the child.

Play is a Means of Self-Expression. The child may learn facts by having them repeated to him by others, but it is only through self-activity that he develops his powers, and the greater the freedom in early years the more complete the development.

Play Trains the Child in Decision. In nearly all games the child is confronted with the necessity of making instant decisions and in acting upon them. No occupation in which he can engage in his early years will give him this training so fully as will play.

Play Teaches the Child Self-Confidence. In his games the child must rely upon himself; in his work he may call upon others for guidance. The game calls for instant personal decision. If the child wishes to emulate his playmates he must act upon his own decisions, and continual practice in so doing develops independence.

Play is Necessary to Health. Health and endurance depend largely upon the full development of the heart and lungs; nothing else contributes so much towards securing this result in children as vigorous play in the open air.

Play Trains in Coöperation and Loyalty. Many games require team work, and success depends upon loyalty to the organization and obedience to the commands of the leader.

Play is Democracy. On the playground native ability is recognized, and all children are given an equal chance. "We may say that the playground is the true melting pot of the various races coming together in the American nation."

Relation of Parents and Teachers to Play. Play begins in the home, and the wise mother

assists the little child in learning to play by teaching it games in which she joins. When the boy has reached the age of eight he needs and should have his father's help in his games. All parents should remember that time which the child devotes to play is most profitably spent, provided the play is of the right sort.

Much can be done in helping children to use to their best advantage the seven or eight hours a day in which they are not in school or asleep, by teaching them how to play. Playground associations, Y. M. C. A.'s and institutional churches are doing this work for the children of large cities, but wherever it is possible the work should be done by the parents.

Teachers should introduce new games and assist the pupils in learning them. This is especially needed in rural schools, where often the pupils know but little about play.

"The child plays not because he is young, but he is young because he plays." All parents and teachers should keep young. W.F.R.

Consult Wood's *Children's Play and Its Place in Education;* Johnson's *Education by Play and Games,* and his *Play in Education;* Curtis's *Practical Conduct of Play.*

Related Subjects. In connection with this discussion of play the reader is referred to the following articles in these volumes:

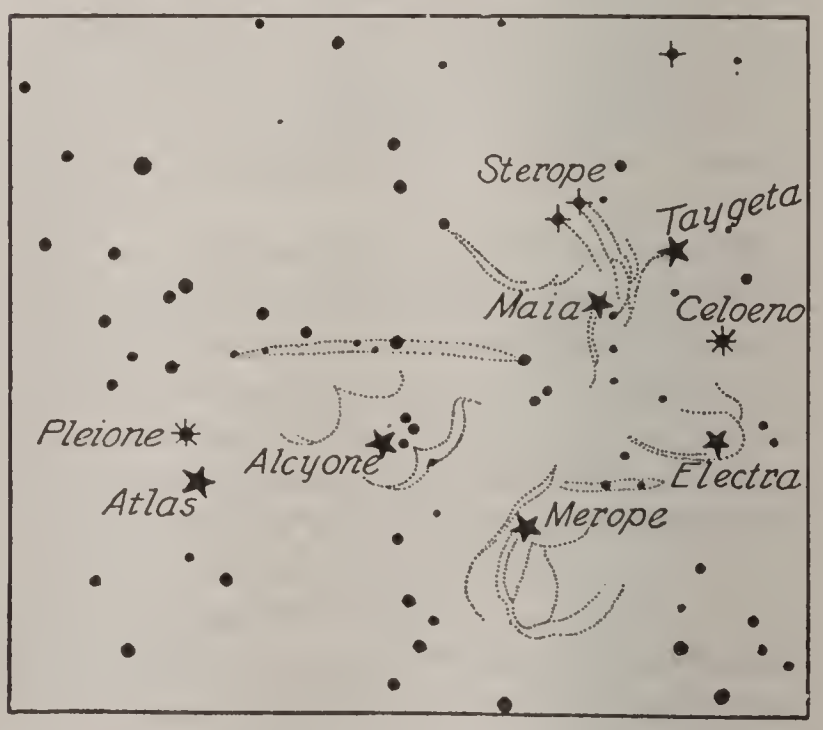
Amusements (with list)	Games and Plays
Athletics (with list)	Kindergarten
Child	Story-Telling
Dolls, Paper	Toys
Education	

PLEBEIANS, *ple be' yanz,* the lower class in ancient Rome, as opposed to the patricians. Originally there was no such class, the population of Rome consisting only of the patricians with their slaves and clients, who had neither political rights nor personal freedom. As the Latin towns in the territory about Rome were gradually brought into subjection, numbers of their inhabitants were taken to Rome, and while a few were admitted to the patrician ranks, most of them were kept in subject relation to the original Romans, thus forming the nucleus of the plebeian order, which in time far surpassed the patricians in number.

The plebeians might hold land, but they had no political rights, and they were not even allowed to intermarry with the higher class. Some few privileges were allowed them under the later kings, but it was not until the time of the republic that they made a determined stand and demanded equal rights with the patricians. After they had gained permission to appoint tribunes to protect their interests, their progress toward political equality was rapid, and in the third century B.C. the two classes were made practically one, with no distinction before the law. See PATRICIAN.

PLEHVE, *pla' veh,* VIATSCHESLAF KONSTANTINOVICH (1846-1904), a Russian statesman who, because of his steady support of autocratic principles, incurred the lasting hatred of the Poles, Jews and Finns, and was killed by a bomb which was thrown under his carriage. He was born in Poland, the son of a poor noble, was educated at Warsaw, and later studied law in Petrograd. In the latter city he rose rapidly to the post of assistant solicitor-general. In 1881, acting with the Minister of the Interior, he attracted the notice of the czar by his able investigation of the assassination of Alexander II.

In 1894 he became Secretary of State, and in 1902 was appointed Minister of the Interior. Plehve earned the bitter hatred of the alien provinces within Russia by his stern methods of dealing with the mixed Russian masses. Though logical of mind, fearless and sincere in his beliefs, he opposed all liberal reform as productive of a dangerous middle class. Early in 1904 an unsuccessful attempt was made upon his life, and in July another attempt resulted in his assassination by one of the Socialist Revolutionary party. His policies did much to increase the discontent of Russia's millions, and possibly hastened the revolution which in 1917 drove the czar from his throne.



Many a night I saw the Pleiads, rising thro' the yellow shade,
Glitter like a swarm of fire-flies tangled in a silver braid.
—TENNYSON: *Locksley Hall.*

PLEIADES, *ple' a deez,* a cluster of stars, of which six are visible to the naked eye and a seventh is easily discernible with the aid of a

small telescope. Legends state that the seven stars are the daughters of Atlas and the nymph Pleione, who were transformed into stars by the gods and placed in the sky. There are various versions of the legend. One states that the seven committed suicide out of grief because of the death of their sisters, the Hyades. Another states that the death of Atlas, who was turned into a mountain at sight of the head of Medusa, led to their suicide. The six visible stars are named Electra, Maia, Taygeta, Alcyone, Celaeno, and Merope. The invisible one, Sterope, is said to hide herself in shame because she alone of the seven married a mortal.

The Pleiades may easily be recognized on any clear night. They are situated in the neck of Taurus, and are usually regarded as the central constellation of the Milky Way. See map, page 445.

PLEURA, *plu'ra,* THE, from a Greek word, *pleura,* meaning *side* or *rib,* is a double sac of thin, watery (serous) membrane. The inner bag, called the *pulmonary pleura,* covers the lung; the other, the *parietal pleura,* lines the cavity of the chest, the *thorax.* When in a healthful condition the two sacs touch each other, and a fluid, as in other serous membranes, moistens them continually, so the motion of the lungs against the thorax in breathing is smooth and painless. There are two pleura, the right and left. They touch at the middle of the *sternum,* or breastbone, and so form a wall for the other organs of the chest. Inflammation of the pleura causes the disease known as pleurisy. See PLEURISY; MEMBRANES.

PLEURISY, *plu'ri si,* inflammation of the serous membrane that lines the inside of the chest and covers the lungs (see PLEURA). In health, these two surfaces of the membrane, being smooth and moist, glide over each other with every breath we take, without any perceptible movement. When the pleura is inflamed the surfaces become dry and rough and rub together with every breath, causing intense pain in the side. Chills and fever, difficult breathing and a short, dry cough are all characteristic symptoms of an attack of pleurisy. In a few hours a small quantity of fluid is poured out in the pleural sac, which in favorable cases relieves pain and is absorbed. Sometimes, however, the effusion is so large as to compress the lung, and continued inflammation in such cases may cause the development of malignant bacteria in the fluid, resulting in serious complications. Physicians usually distinguish these forms as dry pleurisy and pleurisy with effusion.

An attack of dry pleurisy is treated by rest in bed, hot baths, the application of a mustard plaster and strapping the chest to limit the breathing movements. Pleurisy with effusion sometimes requires the operation of tapping the chest to draw off the fluid. In most cases a physician should be called at once. The malady is often the result of exposure to cold, but sometimes it occurs as a complication of pneumonia or tuberculosis.

PLINY, *plin'i,* the family name of two distinguished Roman writers, uncle and nephew, known respectively as the *Elder* and the *Younger.*

Pliny the Elder, whose name in Latin is written GAIUS PLINIUS SECUNDUS, was born in A. D. 23 and died in 79, during the famous eruption of Mount Vesuvius. From Northern Italy, where he was born, he went to Rome while but a boy, and because he came of a wealthy family received the best education the city afforded. As a soldier in the wars with the Germans he distinguished himself, but his attempts to practice law were unsuccessful, and he withdrew to his estates at Novum Comum. In 71 he was in Spain as procurator, and on returning to Rome two years later he adopted his nephew, who became known as Pliny the Younger. Under the Emperor Vespasian, Pliny's personal friend, he received various offices and commissions. Whether at home or traveling from place to place, Pliny never ceased his systematic studies, but read and took notes constantly, and his fund of information has been the marvel of later ages. In 79 he was in command of the Roman fleet, close enough to see the eruption of Vesuvius which destroyed Pompeii and Herculaneum; and anxious to observe as closely as possible the effects, he landed at Stabiae. There he met death from the vapors following the eruption. His nephew describes his death in two letters to Tacitus.

Pliny wrote, in thirty-one books, a continuation of an earlier history of Rome, and various other works; but the only one which survives is his *Natural History.* This was compiled from the notes which he made from readings and observations, and includes not only botany and zoölogy, but geography, astronomy and meteorology. It has no great scientific merit, but contains much information on ancient life and ideas which is not elsewhere available.

Pliny the Younger (62- ?), whose name in full was GAIUS PLINIUS CAECILIUS SECUNDUS,

was born at Novum Comum. He lost his father when but nine years old, and two years later he was adopted by his uncle (see above). The educational advantages given him were excellent, and he made such good use of them that before his twentieth year he was known as one of the most learned men of the time. He studied under Quintilian, was a popular orator, and held a number of offices, serving in succession as military tribune, quaestor, praetor and consul. The last known date in his life is 103, the year in which he was made propraetor of Bithynia; when he died is not known, though it is probable that he lived at least ten years after that time. Besides his eulogy of the Emperor Trajan, nothing of his writings remains except the letters, which give interesting pictures of the life of the times. B.M.W.

Consult Simcox's *A History of Latin Literature.*

PLIOCENE, *pli'o seen,* **PERIOD,** the division of the Cenozoic Era extending from the Miocene to the Glacial Period. The rock systems of the period are more important in Europe than in America. Extensive erosions, which brought material from the mountains and deposited it on the plains, were a strong feature of the period (see EROSION). Along the Atlantic and Gulf coasts an extensive deposit of gravel was formed. Only small areas of Pliocene rock appear in other parts of the United States and none in Canada. During the period plants and animals seem to have removed to those regions in which the climate was adapted to them, and there was an interchange of plants and animals between North and South America. The llama, the camel, the horse, the rhinoceros and the tiger lived in North America. In Europe were found animals similar to those now found in Africa.

Related Subjects. The reader is referred to the following articles in these volumes:

Cenozoic Era
Geology, diagram, page 2439
Glacial Period
Miocene Period

PLOVER, *pluv'er,* a very large family of birds found in almost every part of the world. Many of them are tide birds, living in marshy places and on coasts where they pick up the small bits of food washed in by the tide. Species common in North America are the *black-bellied plover,* a bird having black breast, legs, head and bill and spotted black and white back; the *golden plover,* much like the black-bellied, but having golden-yellow spots on its back; the *ring plover,* having a circle of white around the throat. These three plovers and a few others live inland through the summer months and during that time are much-prized game birds. Their bodies, about 12 inches long, are rounded and their wings long and strong, adapted to long-distance flights.

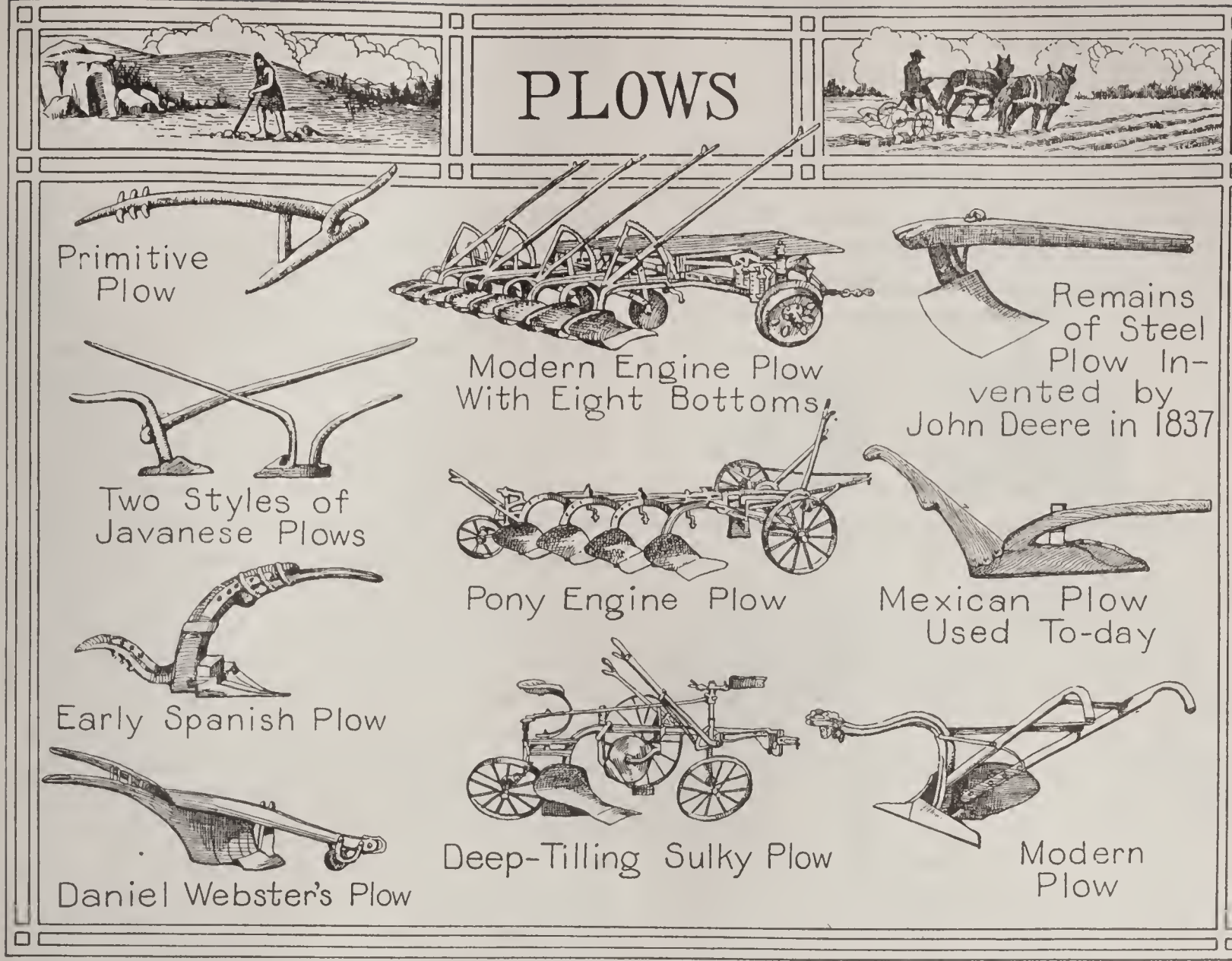
THE RING PLOVER

The golden plover, which of all the family has the greatest range, breeds in the Arctic regions and in winter migrates as far south as Patagonia, in South America. The female, after laying four creamy-white, chocolate-marked eggs in her very crude nest, flies away and allows the father to hatch the eggs. These plovers feed on insects and worms, and are especially fond of grasshoppers.

The black-bellied plovers are very distrustful of people and are constantly finding cause to excite a whole neighborhood of birds with their warning cries. Their nests are mere hollows in the ground, sometimes quite bare, sometimes lined with a bit of dry grass. When the nest is approached the mother bird flies off and limps along the ground, dragging a wing in order to attract attention to herself and away from her eggs. All of the plovers have similar plaintive notes. They have a curious habit, when startled, of running quickly a short distance, then stopping with a jerk to look about in all directions as if to locate the source of danger.

PLOW. When man first began to plant seeds he used a stick with which to dig up the ground. Later he tamed the ox and the ass, and seeing that more soil could be turned up by hitching one of these animals to a forked stick, he took the fork of a tree, sharpened one prong, attached the animal to the other and used the main branch for a handle. This was the first plow, and the plow used by the peons in Mexico to-day is but little better.

It is a far cry from the forked stick to the modern plow, but the degree of perfection in the plows of to-day has been reached only through centuries of study and invention. In this progress America has in the last two centuries taken the lead, and there are now made more than a thousand patterns of plows, each adapted to the special needs of the locality in which it is to be used, or to the preparation of the soil for a special crop. The plow in use on



small farms is an implement that turns but one furrow and can be hauled by a team of horses or a yoke of oxen. The plowman walks behind the plow and keeps it in position by grasping the handles. The parts of this plow are the *beam,* to which the other parts are attached; the *frame,* which carries the *moldboard* for turning the furrow; the *share,* which tears up the soil; the *colter,* or *knife,* for cutting the sod; the *handles,* and the *clevis* for attaching the team. In the modern plow all these parts except the handles are of iron or steel. Plows for breaking greensward are larger and stronger than those used for plowing land that is under tillage.

Riding, or sulky, plows are in general use on large farms. Some of these plows have two, three or four moldboards; one turning two furrows can be operated successfully with three horses or mules. One wheel is larger than the other and runs in the furrow. The depth of the furrow is regulated by levers operated by the driver. Plows turning more than two furrows require proportionately more power, and gasoline or oil tractors or traction engines are used to operate them. Gang plows turning fifty-four furrows are now in use on some of the largest wheat farms. It requires three traction engines to operate one of these gangs, and it will plow an acre in a few minutes.

Consult Davidson and Chase's *Farm Machinery and Farm Motors.*

PLUM, a widely-cultivated orchard fruit, closely related to the peach. Unlike the peach, however, the plum has a smooth coat and an unwrinkled pit. When ripe the fruits are varying shades of purple, red, green and yellow, and they also have a wide range in size. The yellow Burbank plums are nearly as large as a peach; the ordinary purple varieties are sometimes as large as an egg; and some of the wild red plums are not much larger than a cherry. Plums are eaten fresh, dried and marketed as prunes (which see), canned, preserved, made into a delicious butter and into jams and jelly. They are among the most nutritious of orchard fruits; their percentage of carbohydrates is 20.1, as compared with 9.4 for peaches, 14.1 for pears, and 16.7 for cherries.

There are three main classes of cultivated plums, all of which are grown in America; these are the *European,* the *Japanese* and the *American.* The European varieties, which were the first to receive attention from American

fruit growers, are cultivated especially in the Pacific coast states and in New York. The Japanese varieties, introduced to American horticulture about 1870, have a more southern range than the European. American native plums, the result of selection and careful breeding, are cultivated quite generally in the Southern states and from the Atlantic coast as far west as the Rocky Mountains. Among the

THE PLUM

Form of the tree, as seen during the winter; a branch, with the leaves and flowers of spring; the ripened fruit of early autumn.

popular varieties of plums found in the markets are the *green gage,* the *Lombard,* the *Burbank* and the *damson.*

Plums are grown in every state of the Union, and the annual yield for the whole country (including prunes) is over 15,480,000 bushels. Among orchard fruits they rank third, following apples and peaches. Leading states, in amount of crop, are California, Oregon, Washington, New York, Pennsylvania, Missouri and Ohio. A plum sold in large quantities in Canadian markets is the fruit of the Canada plum tree, a variety of the common American wild plum. This tree is distributed from Newfoundland to Manitoba, and is found also in New England and New York, and farther west.

Plum trees are generally propagated by budding young shoots grown from seed (see subhead *Bud Grafting* in the article GRAFTING). As the trees are usually prolific bearers, the fruit is thinned several times a season, that the ripening plums may be kept two or three inches apart. They are prepared for shipment as soon as they have acquired a good color. See CANNING CLUBS; FOOD PRODUCTS, PRESERVATION OF. W.F.R.

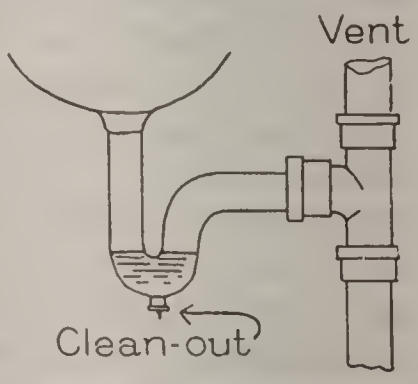
Consult Bartrum's *Book of Pears and Plums;* Wright's "Varieties of Plums Derived from North American Species," in United States Department of Agriculture *Bulletin 172.*

PLUMBA'GO. See GRAPHITE.

PLUMBING, *plum'ing.* There are few things about which the average man knows so little, and about which, if he is a householder, he should know so much, as plumbing. Knowledge of its principles is particularly necessary in smaller communities, where plumbers are likely to be out of touch with the rapid progress of sanitary science. But it is helpful anywhere, especially in judging whether a plumber is installing unnecessarily expensive work or is omitting wise steps, to save money for himself. Most cities have printed regulations concerning the vital points, and, although these are not infallible, in the larger cities they usually embody correct ideas; a copy of them would be valuable to anyone having plumbing work done.

Modern plumbing fixtures, especially those for the bathroom, are often admired for their beauty, but their cleanliness is what really gives them value. The old-fashioned marble washbowl which collects dirty waste in its joints and corners; the sheathed-in bathtub which gathers dust and dirt around its edges; the kitchen sink built of more or less porous materials which absorb grease and dirty water—all are insanitary; but nothing cleaner can be imagined than the smooth, nonabsorbent and cornerless fixtures it is now possible to secure.

More important, however, than the visible details of plumbing are its concealed portions. Here the thing to guard against is the escape of sewer gas coming either from the sewer outside the house or from the drainage pipes within. Every householder should understand how a *trap* operates, for it is in respect to traps that careless or ignorant plumbers make the most serious mistakes.



THE HALF S-TRAP

The water in it is called the seal, because no gas can escape through it.

The commonest trap is the half S-trap, one form of which is shown in the illustration. Since it depends for its efficiency upon the presence of water, every precaution should be taken to prevent the exhaustion of its contents. The chief danger is from siphoning (see SIPHON), which

will draw out all the water if a vacuum is formed in the waste pipe. To prevent this there should always be a vent, unless a truly siphon-proof trap is used. There are a few such traps approved by plumbing inspectors, but many others are falsely so-called. Venting adds very much to the expense of plumbing, but is too important to neglect. The second danger to a trap is that its seal may be forced out by pressure of gases in the sewer, but this is not liable to occur if the vertical stacks (main drainage pipes) end above the roof. A third danger, from evaporation, is present only when a fixture is seldom used.

Every fixture, even an ice box, should have a trap. Because it contains food, an ice box should be specially protected by having two traps with an open drip pan between. But there should never be two traps in succession without the intermediate opening, for what is called an air-lock will eventually prevent drainage through the pipes. Where a bathtub or other fixture has an overflow outlet, this must never be connected to the sewer side of the trap. Each trap should have an accessible clean-out, but this should be on the under side, where, if it is leaky, no gas can escape. Main traps, at the point where the drain leaves the house, are omitted in some cities in order to give ventilation to the general sewer, but the omission is opposed by many sanitary engineers because it may cause the gases of the sewer to be forced out when there is a leak in the household pipes, or whenever a fixture trap is removed or opened for cleaning. A main trap, if installed, must have a fresh-air inlet.

Stacks should never enter the house drain at right angles, and above the roof they ought always to be at least four inches in diameter, to escape being frosted over in cold weather.

Testing for Leaks. The tests required by plumbing inspectors in cities should be performed wherever possible. The commonest are the water test for new houses and the smoke and peppermint tests for old ones. Each test is made twice, first when only the rough plumbing is in place, afterwards when all the fixtures are installed. In the first, of course, all ends of pipes are plugged, in the second all traps are given a seal. The water test consists in filling the system with water, gradually, so that leaks may be discovered as soon as they occur, then allowing the water to stand several hours. In the smoke test heavy black smoke is introduced into the pipes and air pressure then applied. The peppermint test depends upon the penetrating odor of two ounces of oil of peppermint mixed into a gallon of hot water. This is not so reliable as the smoke test. C.H.H.

Consult Gerhard's *House Draining and Sanitary Plumbing;* Starbuck's *Standard Sanitary Plumbing.*

PLUMMET, *plum'et,* a weight let down at the end of a cord to sound the depth of water or of excavations, or to regulate work such as measuring, by keeping it *plumb,* or in a straight line. In building a wall the plummet is constantly used by masons. It usually consists of a line fastened to a narrow board at one end and at the other end to an egg-shaped piece of lead. The weight of the lead keeps the line straight, giving an accurate measure for maintaining the perpendicular. If used near a range of mountains the plummet is found to be incorrect, the attraction of the mass of mountain drawing the metal weight slightly out of line. The difference caused by this attraction, while slight, would be sufficient to throw a high wall quite out of the perpendicular. The attraction, therefore, in such cases has to be allowed for that the building line may be kept accurate. It is also stated that on the seacoast the ebb and flow of the tide have a direct influence on the plummet.

PLUSH, a material similar to velvet, but with a longer, softer nap. The nap was formerly always of mohair, the hair of the angora goat, but silk is now commonly used. Worsted plush with mohair nap is used in making cloaks, caps, hats, and other articles of wearing apparel. Plush with a silk nap is used for men's silk hats, for ornaments on women's hats and dresses and in upholstery. In Europe plush is extensively used for breeches worn by footmen, and for this purpose is made in a variety of colors. London and Lyons are particularly noted for the manufacture of plush.

PLUTARCH, *ploo'tarck* (about A.D. 46-about 125), a Greek biographer and essayist, born at Chaeronea, in Boeotia, near the homes of Hesiod and Pindar. He was educated at Athens and by travel through Greece, Italy and Egypt, in which countries he apparently had access to numerous libraries and records. In his old age he was the religious or ethical guide to a large number of young men and was considered one of the most entertaining talkers of his day.

His *Parallel Lives of Illustrious Greeks and Romans,* commonly referred to to-day as *Plutarch's Lives,* were written generally in pairs,

one Greek and one Roman, and are famous as models of intimate, living biography. In the Middle Ages they were the inspiration of innumerable tales, romances, poems and treatises; they were used by Shakespeare and other Elizabethan dramatists, and are yet looked upon as an important source of our knowledge of antiquity.

Plutarch's other writings, *Moralia,* consisting of philosophical and ethical discussions, are quaint and pleasant, but not important. Many of these are in the form of dialogues and discuss in the light manner of "table talk" of that day such topics as "How a Young Man Ought to Read Poetry," "Rules for the Care of Health" and "Advice to the Married." In the *Lives,* however, is to be found some of the most serious work in ancient literature. They are not rendered dull by severe scholarship, but are keen character sketches, each offering a lesson in public morality and honesty. Because of their influence over many famous men they have been called "the food of great souls."

PLUTO, *ploo'toh,* also called HADES, ORCUS, or DIS, in Greek mythology, was the ruler of the lower world. He was the brother of Jupiter and Neptune, and the portion of the universe which fell to his lot well suited his gloomy disposition. His palace was within the earth—a dark and dreary place, to which, sooner or later, all mankind came. The god was not really cruel, but he was very jealous of his power, and since he never yielded to petitions to allow the dead to return to earth, he became an object of detestation to all men. Few temples were erected to him, though all feared him so much that they dared not refuse to worship him. That with all his severity Pluto was capable of affection and longed for it in return is shown by the story of Proserpina, whom he carried off to be his queen (see PROSERPINA). Since gold, silver and the other metals were found hidden in the earth, Pluto was regarded as the god of riches, though in this capacity he was usually called Plutus. The English word *plutocrat* is thus traced back to this old myth.

Related Subjects. The following articles in these volumes will make clearer the references in this discussion of Pluto:

Cerberus	Neptune
Hades	Proserpina
Jupiter	

PLUTUS, *ploo'tus,* in Greek mythology, the god of riches. He was the son of Iasion (Jason) and of Demeter (Ceres), goddess of agriculture. Because he bestowed his gift of wealth only on the good and noble, Zeus struck him blind so that none should be favored, but good and bad alike receive riches. In art Plutus is usually represented as a child held in the arms of a goddess, especially Pax, the goddess of peace, who befriended him when he was deserted by his parents. The word *plutocrat,* meaning a person who exercises power because of his riches, comes from *Plutus.*

PLYMOUTH, *plim'uth,* a seaport and well-fortified naval station in Devonshire, England, about which is centered much of historical interest. From Plymouth, Sir Francis Drake in 1577 set sail on his trip around the world, and Sir Humphrey Gilbert in 1583 started from there on his second colonizing expedition to America. The town was also the last port visited by the *Mayflower* when it carried the Pilgrims to a new Plymouth in the New World.

The place is a Parliamentary and county borough, and is situated at the head of Plymouth Sound, between the Plym and Tamar estuaries, 231 miles southwest of London. West of it are the township of East Stonehouse and the borough of Devonport, the three being known as the "Three Towns." Among the many interesting public buildings of Plymouth are the Municipal Museum and Art Gallery, the Royal Naval Hospital, Saint Andrew's Church, which is nearly five hundred years old, and the Guild Hall. Shipbuilding and fisheries are the most important industries, and the port, in normal years, has a prosperous foreign trade. Population in 1921, about 115,500; of the Three Towns, 209,857.

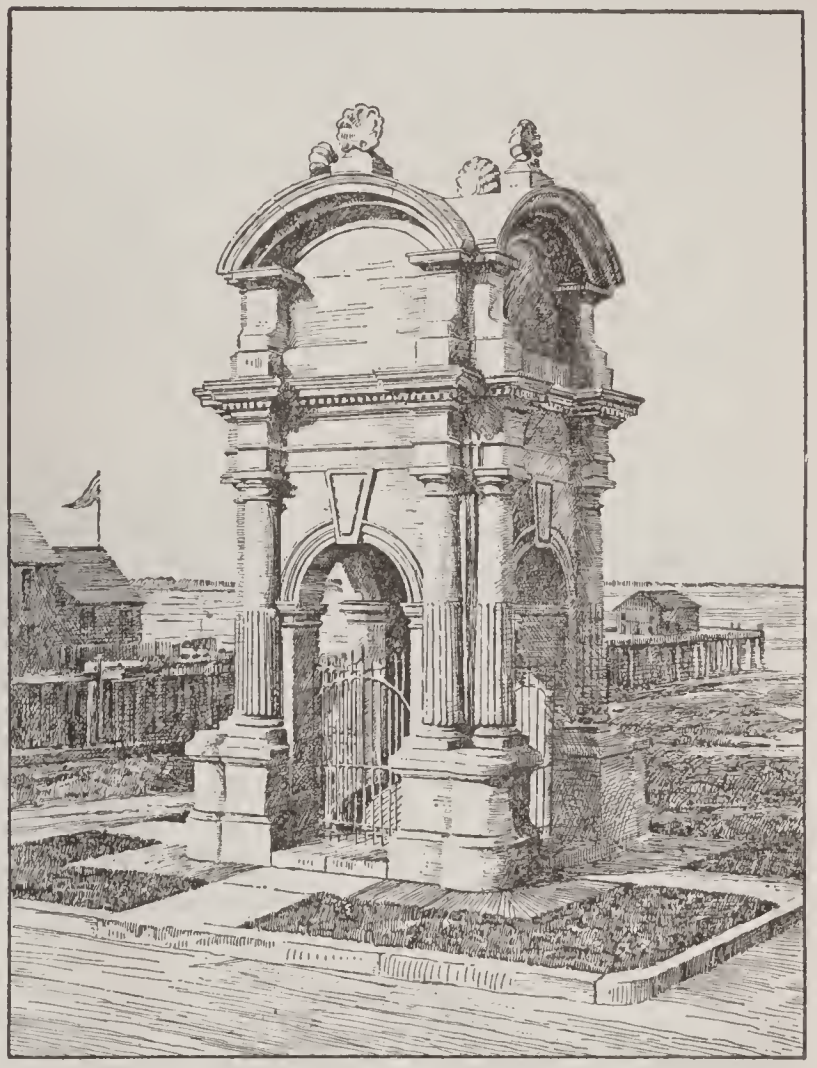
PLYMOUTH, MASS., famed as the first permanent English colony in New England, was founded in December, 1620, by the Pilgrim Fathers. The town, which is a port of entry and the county seat of Plymouth County, is situated thirty-seven miles southeast of Boston, on Plymouth Bay, an inlet of Massachusetts Bay. Transportation is furnished by the New York, New Haven & Hartford Railroad, and by electric interurban lines, and in summer boats make regular sailings to Boston. In 1910 the population was 12,141; in 1920 it was 13,032, a gain of seven per cent.

Plymouth extends nearly fourteen miles along the bay and five miles inland. Plymouth Rock, sheltered by a small, open granite structure, is near the boat landing. Among many historical features are Leyden Street, along which the first cabins were built, the Town House, and Burial Hill, where the fort and meeting house and watchtower stood, and where many of the

little colony were buried. In Pilgrim Hall, a fine granite structure in the Greek style of architecture, the depository of *Mayflower* relics, are paintings of events of the early days, and such treasures as the original colonial charter, dated June 1, 1621, the sword of Miles Standish and Governor Bradford's Bible.

A national monument to the Pilgrims was dedicated in 1889. Appropriate tablets mark various historic sites, and a few old colonial houses still stand. Prominent modern structures are an $85,000 Federal building, occupying the site of Elder Brewster's homestead; and a courthouse, state armory, public library, Jordan Hospital and several hotels. Morton Park is a beautiful wooded reserve of 200 acres.

Plymouth is an important industrial center. Its cordage works are among the largest in the world, having an annual output worth $10,000,000. Other manufactures are woolen and worsted goods, zinc and copper products, insulated wire, rugs and mats. The value of all products in 1920 was $31,200,000. Plymouth and its neighbor town Carver together harvest about one-fourth of all the cranberries grown in the United States. This crop has an annual value of about $300,000.



Down to the Plymouth Rock, that had been to their feet as a doorstep,
Into a world unknown,—the corner stone of a nation!
—LONGFELLOW: *Courtship of Miles Standish.*

The historic rock on which it is said the Pilgrims first set their feet on landing in the New World is preserved under a marble canopy in the city of Plymouth.

The town was named for Plymouth, England. It was the seat of government of the colony until 1692, when it was united to Massachusetts. See illustration, in article PLYMOUTH COLONY.

PLYMOUTH, PA., a borough in Luzerne County in the northeastern part of the state, chiefly engaged in the coal industry. It is located four miles west of Wilkes-Barre, on the Susquehanna River, in a region rich in anthracite coal. The mining and shipping of coal and the manufacture of mining machinery are almost the only occupations of the people. Plymouth was settled in 1768, and during the trouble between Pennsylvania and Connecticut over the state boundaries, in 1799, it was claimed by both states. The Delaware & Lackawanna Railroad serves the borough and electric lines operate to cities and towns northwest and southwest. In 1910 the population was 16,996; in 1920 it was 16,500, a slight decrease.

PLYMOUTH COLONY, next to Jamestown, the oldest permanent English settlement in America. It was founded in 1620 at Plymouth, in what is now Massachusetts, by a body of English Separatists, whom Governor Bradford was wont to speak of as "pilgrims upon the earth." One hundred two of their number sailed in the *Mayflower* and the *Speedwell* from Holland, whither they had fled twelve years before to escape persecution in England. The *Speedwell* was obliged to return, but after a stormy voyage of nine weeks, the *Mayflower* entered Cape Cod Bay. It was by accident that the Pilgrims reached this part of the country, for they had planned to settle near the mouth of the Hudson, within the jurisdiction of the London Company. See PLYMOUTH, page 4712; PLYMOUTH ROCK, page 4715.

While their little ship was rocking in the harbor, the "Pilgrim Fathers" met in its cabin and swore loyalty and obedience to the government they had framed. After exploring the coast, they landed at Plymouth Rock, December 21, 1620.

"Above them spread a stranger sky;
Around, the sterile plain,
The rock-bound coast rose frowning nigh;
Beyond—the wrathful main:
Chill remnants of the wintery snow
Still choked the encumbered soil,
Yet forth those Pilgrim Fathers go
To mark their future toil."

Consult Bradford's *History of Plymouth Plantation;* Bliss's *Old Colony Town, and Other Sketches.*

Related Subjects. In connection with a study of Plymouth Colony, the following articles in these volumes will be found interesting:

Alden, John
Bradford, William
Carver, John
Courtship of Miles Standish
London Company
Massachusetts, subhead *History*
Massachusetts Bay Company
Mayflower
Pilgrims
Plymouth, Mass.
Plymouth Company
Plymouth Rock
Puritans
Standish, Miles

"LAND OF THE PILGRIMS' PRIDE"

Plymouth, Mass., in 1622. From the lower left hand corner the buildings, in order, were the storehouse and the residences of P. Brown, J. Goodman, William Brewster and J. Billington; beyond these the identity of the occupants in that line of houses is not known. Across the street within the stockade was the home of Governor Carver. The picture is from a painting by W. L. Williams; historians have regretted that other paintings, to show the arrangement of the entire colony, are now impossible to produce.

The Indians who originally occupied this shore had died of a pestilence a few years earlier, and the Pilgrims took possession of their abandoned fields. During the first year, scarcity of food, exposure and disease caused the loss of half of their number, including their governor, John Carver. William Bradford, one of the noblest characters of colonial history, was chosen as the second governor, and through his guidance and courage and the perseverance and faith of the people, the colony survived.

The following year, fifty more of their people came from Leyden, Holland. Under the leadership of Bradford, who was the governor for more than thirty years, and the protection of the brave and able Captain Miles Standish, the colony prospered. The communal system, which had been adopted during the first year, was abandoned, and a democratic government was permanently established. E.D.F.

PLYMOUTH COMPANY, in American history, an English colonization and trading company, incorporated in 1606 under a charter granted by James I. This company, which was composed of Plymouth and Bristol merchants, was formed at the same time as the London Company. The king granted to the Plymouth Company colonization rights in America from the Rappahannock River to the eastern point of Maine, or, according to some authorities, to the northern limit of the mainland of Nova Scotia. The exact limits of the grant cannot be stated positively. The relations of the company to the king were defined by the charter, which provided that the lands colonized were to be held free of any military or other service to the king, but that the Crown should receive a fifth part of whatever precious metals were found. The appointment of the governing councils lay with the king, but settlers were guar-

anteed the rights and privileges of English citizens.

In 1607 the company made an unsuccessful attempt to plant a colony in Maine, near the mouth of the Kennebec River; it has to its credit no permanent settlement. A new company was formed in 1620 known as the Council for New England, but this organization relinquished its powers to the king in 1635. The colony established at Plymouth in 1620 was an independent venture, and had no connection with the original Plymouth Company. B.M.W.

See, in this connection, PLYMOUTH COLONY; PILGRIMS; also titles there suggested.

PLYMOUTH ROCK, a huge granite boulder on the edge of the water at Plymouth Harbor, Massachusetts. When the *Mayflower* reached America on December 21, 1620, the Pilgrims disembarked on this rock. In 1774, when it was raised to be consecrated to liberty, it split into two pieces, an incident which was regarded as an omen of the separation of the colonies from England. On July 4, 1834, part of the rock was removed to Pilgrim Hall. The other half, covered with a granite canopy and surrounded by an iron fence, may still be seen in the harbor. See illustration, in article PLYMOUTH, MASS.

PNEUMATICS, *nu mat'iks,* that branch of physics which treats of the properties of gases, either at rest or in motion. It includes the study of the atmosphere. How useful and important such a study is becomes evident when we consider that we are living at the bottom of an atmospheric ocean, just as fish are living beneath the surface of a water ocean. As a result of the knowledge acquired about the properties of gases and the laws governing them there have been constructed numerous tools and machines used in modern industry, all of which are based on the laws of pressure and elasticity of the air. The operations of various kinds of pumps are also based on the same principles. See AIR PUMP; PUMP; PNEUMATIC TOOLS.

PNEUMATIC, *nu mat'ik,* **TIRES.** The pneumatic tire became prominent in 1889, when it was first applied to the bicycle, although a pneumatic tire was patented in England in 1843, and in the United States in 1847. Its name is derived from the fact that it is filled with compressed air. Pneumatic tires are now used on automobiles, bicycles and motorcycles, each of which is described in these volumes under its title.

Manufacture. A pneumatic tire consists of two parts: an inner tube of thin rubber which is air-tight, and an outer tube or case consisting of several layers of strong fabric into which rubber has been pressed, with an outer covering of harder rubber. The rubber reaches the tire manufactories ready for use. For its preparation, see RUBBER AND RUBBER MANUFACTURE.

The Inner Tube. The sheets of rubber for the inner tube are cut into strips of the length and width necessary to make tubes of the required size. The long edges of these strips are beveled, so that they will form a smooth, strong seam. The strip is then drawn over a mandrel and the edges are nicely fitted together and held in place by wrapping the mandrel with thin pieces of wet cloth, upon which strips of wet duck are wound spirally. The whole is then heated until the edges are cemented together. After cooling, the tube is removed from the mandrel by being turned inside out. An air valve is then inserted and the ends of the tube are cemented together. With this last process the tube is ready for use.

The Outer Tube. The outer tube or case needs to be strong enough to sustain the weight of the vehicle for which it is made. The outer case of a bicycle tire is light; that of a motorcycle tire is much heavier and stronger, and still stronger casings for automobile tires vary in weight and strength according to the weight of the automobile for which they are made. This case is the most important part of the tire. Only the best material can be permitted to enter into its construction, and it should be made with extreme care. A strong cotton fabric is the most desirable for making casings. Rubber is pressed into this cloth by passing it with a sheet of rubber between steel rollers that press the two sheets together. The resulting fabric, known as *friction* by the workmen, is cut into strips of the proper size by machinery. The strips are placed between layers of cotton cloth to keep them from sticking together and are allowed to cure.

In the actual building of tires, the hand process is regarded with most favor, although machines may be used. The builder mounts the core on which the tire is to be shaped, on a building stand. The first ply of fabric is then stretched on the core and is spliced, rolled down with a hand roller and trimmed at the base with a knife. Other plies are treated in the same manner, and then a layer of rubber compound about one-sixteenth of an inch thick is applied. The tread, or outer center surface, is then folded over the whole. This is made by laying up narrow strips of rubber in different

widths in such a way that the greatest thickness is in the center. A strip of fabric known as the *breaker strip* is sometimes placed under the tread. From the builders, the core and its wrappings are sent to the press room, where they are put into molds and subjected to pressure and heat. After being thus vulcanized, the tire is removed from the mold and is sent to the finishing room.

Automobile tires are warranted to run from 5,000 to 10,000 miles, according to quality. The maximum air pressure they are rated to withstand is twenty times the diameter of the tube. That is, a new tire four inches in diameter should sustain a maximum pressure of eighty pounds to the square inch, and one three inches in diameter should sustain a pressure of sixty pounds. The cost of automobile tires depends upon size and quality and varies from about $15 to $80. Akron, Ohio, is the greatest center in the world for the manufacture of pneumatic tires. It is estimated that the American automobile industry requires about 80,000,000 rubber tires a year. See AUTOMOBILE; MOTORCYCLE; BICYCLE. C.H.H.

PNEUMATIC TOOLS, implements used in industry which are operated by compressed air. The word is derived from the Greek *pneumatikos,* meaning *relating to air or wind.* Pneumatic tools are of two classes—those which operate by striking and those which rotate. In the striking class are included hammers, riveting, caulking, chipping and rock-drilling tools. Drills and boring tools belong to the rotating class.

Probably the most efficient of all pneumatic tools is the hammer, with a piston in the handle working with a backward and forward motion. The power is supplied by compressed air through a flexible hose which allows the tool to be worked at any required angle. With such a hammer it is possible to deliver up to 20,000 blows per minute; city dwellers are familiar with its noisy operation in the processes of riveting the steel work in modern office buildings. The compressed air usually has a pressure of from eighty to 125 pounds per square inch, and is controlled by a valve in the handle of the tool.

PNEUMATIC TUBES, or **PNEUMATIC DISPATCH,** a system or method of sending mail, dispatches and parcels through tubes, either underground or above, by means of air pressure. In 1667 this method was first suggested by Denis Papin, who read a paper before the Royal Society of London explaining a device for sending a carrier containing mail through tubes by means of suction. Improvements on his suggestion, which were not commercially adopted until 1835, have led to the development of various forms of pneumatic transportation devices in every civilized country.

The necessary apparatus consists of a series of tubes, an air compressor and air-tight cylindrical carrying cases. The first pneumatic dispatch tubes installed only allowed the carriers to be sent in one direction, and to but one destination. This was improved upon by the use of alternate suction and pressure which allowed the carriers to travel both ways. This form was further modified by circular systems in which a current of air kept continually moving and the carriers could be withdrawn from the tubes at regular intervals or stations.

The pneumatic dispatch system has since 1870 proved successful in connection with the general post office, London, especially in the telegraph department, and there is now in use in this connection in that city a series of underground tubes over forty miles in length. The postal authorities and the telegraph companies in the United States have installed pneumatic dispatch systems in all large cities. Department stores and large retail stores in the States and in Canada employ the principle in tubes for conveying money from the counters to the cashier's desk. The development of pneumatic dispatch has not been so rapid in America as in Europe, but it is greatly increasing, the system having been proved economical and efficient.

In pneumatic tubes of two and a quarter inches in diameter, worked with an air pressure of ten pounds per square inch, containing carriers which hold seventy-five ordinary messenger forms, a speed is obtained in transit of a mile in two and one-half minutes. Large tubes for pneumatic dispatch, eight inches in diameter, are built for conveyance of carriers seven inches in diameter and twenty-four inches long. These tubes require an air pressure equal to thirty horse power, and the carriers are propelled through the tubes at the rate of thirty miles an hour.

Consult Batcheller's *The Pneumatic Dispatch Tube System.*

PNEUMONIA, *nu mo' ni a,* a dangerous and common disease in which the most serious trouble is inflammation of the lungs. According to the United States Census Bureau, about one-third of all the deaths occurring in a year

are due to tuberculosis, heart diseases and pneumonia. Pneumonia is caused by a specific germ and is slightly contagious. An attack begins suddenly with chills and headache; then follows a high fever accompanied by a hard, dry cough, pain in the chest and difficult and painful breathing. The patient soon begins to raise a brownish-red phlegm from the lungs. In severe cases delirium may occur. Nothing can stop the course of the fever and inflammation, which may run on for five to eleven days. When the patient seems at his worst the crisis occurs. In favorable cases the fever abates and the breathing becomes easier, and the patient awakens feeling very weak but fairly comfortable; death is caused by heart failure or by suffocation.

Pneumonia patients need especially careful nursing, as there is no medicine known which will cut the disease short. Physicians center their efforts on keeping up the patient's strength, supporting the heart and reducing the temperature. The application of hot poultices to the chest has been found helpful in allaying inflammation. It is essential that pneumonia patients have an abundance of fresh air, and in some hospitals they are treated on enclosed porches or in tents out of doors. During convalescence it is customary to give tonics. When possible removal to a dry, warm climate is advisable.

Pneumonia works greatest havoc among drinkers and others whose bodily resistance has been lowered. It is prevalent in winter and early spring, and during these seasons one should be careful to avoid exposure to cold and dampness, and endeavor to keep up the vitality by hygienic living.

PO, the largest river in Italy, remarkable for its width, for the volume of water it carries from the mountains to the sea, and for the great fertility it gives to the lowlands which it waters. From its source in Monte Viso, in the Alps, it flows in an easterly direction along a course of about 420 miles, receiving the Ticino, the Adda, the Mincio, the Penano and numerous other streams, and discharging through a large delta into the Adriatic Sea. The principal cities on its banks are Turin, Cremona and Piacenza. In spite of artificial embankments, first built by the Etruscans nearly 300 B.C., disastrous floods repeatedly occur. The river's continual deposits raise the level of the water, and with the corresponding elevation in the embankments the river at Ferrara has been raised to the level of the housetops. The deposits from the mountains increase the extension of the delta into the sea at the rate of 200 feet each year. The river is well supplied with shad, salmon and sturgeon. It is rapid in its upper courses but becomes a sluggish stream long before it reaches the sea, and carries considerable local commerce.

POCAHONTAS, *po ka hahn' tas* (1595-1617), an American Indian princess, born in Virginia. She was the daughter of Powhatan, chief of the Chickahominy tribe, and her father's dealings with the white settlers made her acquainted with several citizens of Jamestown, notably Captain John Smith. He mentioned her in his *True Relation of Virginia,* published in 1608, as a spirited and beautiful child of about ten years of age. He declared that his first meeting with her was in 1607, when her father was about to kill him with a great stone club. "At the minute of my execution," says Smith, "she hazarded the beating out of her owne braines" by placing her head upon his and begging her father to spare him. Much doubt has been thrown over the story by historians, but whether true or false, it remains the first American romance. Pocahontas frequently visited Jamestown until Smith returned to England in 1609, and then she was not seen in the village for three years.

In April, 1612, she was captured and held as a hostage for white prisoners in the possession of the Indians, and one year later was converted to the Christian religion and baptized at Jamestown. In April, 1614, she married John Rolfe, and in 1616 she went with him to London. There she was introduced as the daughter of an American king, and was welcomed into the homes of the royalty. The new form of life, with its restraint and pomp, did not agree with her, however, and shortly after the birth of her son Thomas she died at Gravesend, near London, where the record of her death and her tomb may still be seen in the parish church. Her son removed to Virginia in his early manhood, and from him sprang some of the most noted families of Virginia, among the most famous of such descendants being John Randolph.

Consult Eggleston and Seeley's *Pocahontas;* E. B. Smith's *Pocahontas and Captain John Smith.*

POCATELLO, *po ka tel' o,* IDAHO, the county seat of Bannock County, is in the southeastern part of the state, 264 miles east and south of Boise and 170 miles north of Salt Lake City. It is on the Port Neuf River and is a division

headquarters of the Oregon Short Line, a road employing 2,300 men in Pocatello in yards and machine shops. Features of note are the Idaho Technical College, the Federal building, completed in 1915 at a cost of $125,000, Short Line Station, Y. M. C. A. building, Elks' Club, Carnegie Library and two hospitals. Pocatello is a wholesale distributing point, has a large meat-packing plant and is the commercial center of a large agricultural and stock-raising country. In 1910 the population was 9,110; it was 14,961 in 1920, a gain of 64 per cent. The area is about three square miles.

POE, *po,* EDGAR ALLAN (1809-1849), an American poet and story-writer, was born in Boston on January 19, 1809. His grandfather was a revolutionary officer of an honored Baltimore family; and his parents were respectable actors. Left an orphan at two years of age, Poe was adopted by Mr. Allan, a wealthy merchant of Richmond, Va. His education consisted of five years in an English school, several years in a Richmond academy, and one session at the University of Virginia, from which Mr. Allan removed him, probably because of extravagant losses at gambling. He entered a countingroom, but soon quarreled with his foster-father and left home. In 1827 he reappeared in Boston, published his first volume of poems, and, desperate for money, finally enlisted in the regular army. After serving two years at Fort Moultrie and Fortress Monroe he was honorably discharged through the interventions of Mr. Allan, who also obtained his entrance to West Point. Poe's deliberate unruliness there, followed by court-martial and dismissal within six months, turned his adopted parent against him completely. In his school life Poe left a record of wide reading and of brilliance in languages, mathematics and athletics, but not of steady effort or good-fellowship.

EDGAR ALLAN POE

His life was crowded with changing scenes, and was overshadowed by constant reverses and ill fortune, brought about by his own faults of character. His literary career was distinguished, and reflected almost unapproachable genius.

A Meteoric Career. He was now on his own resources. In 1833, while living with his aunt, he won a one-hundred-dollar prize for the tale *A Manuscript Found in a Bottle.* This success brought him friends, and soon after his marriage with his young cousin, led to his connection with a Richmond periodical. Within a year, by his tales, poems and literary reviews,

WHERE "THE RAVEN" WAS WRITTEN

This "Poe Cottage," in Fordham, near New York City, has been moved from its original location, shown above, to a small park, where it is preserved as a Poe memorial.

he increased the circulation of the magazine sevenfold. He worked tirelessly, and made this the most pleasant and fruitful period of his life. Soon he was set adrift, however, to serve briefly but brilliantly with *The Gentleman's Magazine, Graham's Magazine,* and several others, but always with the same result—dismissal for unjust criticisms in his articles or for irregularity due to intemperance. The brightest part of his life story is his love for his childwife, but the strain caused by her long illness and her death in 1847 prostrated Poe, who never recovered his former vigor. Although never dissipated for long periods, he drank more and more frequently. Alcohol was always a maddening poison to his system, and at length he was found unconscious in Baltimore, where, on October 7, 1849, he died from his excesses.

Estimate of the Poet. Poe's great mind was not balanced by a great character, and every step in his life shows the tragedy of a weak will. His work was of three kinds—critical, poetical and narrative. His was the first broad and really artistic criticism in America, but although sometimes farseeing and stimulating, it was fully as often woefully wrong. His remarks on Longfellow were particularly violent, but the older poet met them with uniform charity and was always unsparing in his

praise of Poe's work. Poe defined poetry not as truth or as passion, but as music, and in this music of words some of his own poems are unrivaled. *The Raven, The Bells, Annabel Lee* and *Ulalume* show his power at its height. By reason, therefore, of this handful of short poems he ranks among the truest poets America has ever produced. Though Poe's greatest fame rests on his poems, he is best known in Europe for his tales, *Ligeia, William Wilson, The Gold Bug, The Purloined Letter, The Fall of the House of Usher,* and others, which lose little in translation and are unaffected by time or place. His realms of fancy are completely removed from the real world of humanity, and are consequently as real in one land or century as in another. Horror, ingenuity and action he handled with consummate skill, but had no power of character drawing. In his rather limited sphere, however, his unique genius makes him a lasting world figure, and in his own country candid judgment is recognizing his right to a place among great writers, while admitting that his lack of a true, passionate inspiration prevents his ranking as one of the very greatest.

A.MC C.

Consult Woodberry's *Edgar Allan Poe;* Leigh's *Edgar Allan Poe, the Man, the Master, and the Martyr.*

POET LAUREATE, *law're ate,* a title conferred by the Crown upon an English poet. Among the ancient Greeks it was customary to crown with a wreath a poet who was successful in a contest, and from the laurel of which the wreath was composed has come the word *laureate.* Originally the poet laureate had as a specific duty the writing of odes on important national occasions, but in late years this has by no means been rigidly required. Tennyson, however, wrote a number of his best-known poems for state occasions. The laureate is by tradition a member of the royal household; the sum received by him has varied at different times, some of the earlier appointees having received as much as £300 ($1,500) a year, while the compensation to Tennyson was but £100 ($500). Ben Jonson was the first poet formally appointed laureate by the Crown, but certain poets before his time really performed the duties and were shown the honors which later belonged to the office. The complete list, including three "honorary" laureates, follows:

NAME	BORN	APPOINTED	DIED
Geoffrey Chaucer	1340?	1368	1400
John Gower	1325?	1400	1408
Henry Scrogan, P. L. to Henry IV	1361?	?	1407
John Kay, P. L. to Edward IV			
Andrew Bernard, P. L. to Henry VII and Henry VIII		1486	1523
John Skelton	1460?	1513	1529
Richard Edwards	1523?	1561	1566
Edmund Spenser	1553	1590	1599
Samuel Daniel	1562	1599	1619
Ben Jonson	1573	1619	1637
Sir William Davenant	1605	1638	1668
John Dryden	1631	1670	1700
Thomas Shadwell	1640	1688	1692
Nahum Tate	1652	1692	1715
Nicholas Rowe	1673	1715	1718
Rev. Lawrence Eusden	1688	1718	1730
Colley Cibber	1671	1730	1757
William Whitehead	1715	1757	1785
Thomas Warton	1728	1785	1790
Henry James Pye	1745	1790	1813
Robert Southey	1774	1813	1843
William Wordsworth	1770	1843	1850
Alfred, Lord Tennyson	1809	1850	1892
Alfred Austin	1835	1896	1913
Robert Bridges	1844	1913	....

Consult Gray's *The Poet Laureates of England: Their History and Their Odes;* West's *The Laureates of England.*

POETRY, *po'et ri,* one of the two great classes into which all literature is divided, the other being prose. A definition of poetry which is universally acceptable has perhaps never been written, and much controversy has raged over the subject. Some critics hold that if the thought contained is imaginative and makes an appeal to the emotions, and if the language is artistic and musical, the form is of little importance; while others declare the metrical form to be one of the first requisites. In general, however, the term *poetry* is seldom applied to any composition which is not metrical. That does not mean that all poetry must have the rhythmic swing to which modern ears are so well accustomed, for the Hebrew *Psalms* are certainly poetry; but they had in the original a rhythm very perceptible to the people for whom they were written.

Though prose is the simpler form of composition and it might be thought that prose literature would be the first to grow up, the opposite was the case. Almost every nation, in its very early stages, had poetry of some sort—songs which might be chanted to rude music, and which were almost invariably part of the worship of some god. And gradually the figurative language, the rhythmic form without the music, came to be used for other than religious purposes. The deeds of the gods, as well as their praises, are set forth, and then, by a natural transition, the deeds of great national he-

roes. Thus narrative poetry, the epic and the ballad, was one of the earliest forms of poetry. The lyric, too, was a direct outgrowth of these early songs set to music, and even dramatic poetry grew out of the choral chants in honor of Bacchus. These three classes really comprise all poetry, if satirical and didactic verse be excepted; and as these two contain little imagination or emotion, and appeal chiefly to the intellect, they are not by all critics classed with poetry.

As to the form of poetry, the variations which have been invented are almost infinite. Yet there are certain well-defined rules which no poet would violate. A tragedy in rhymed couplets, for instance, would be an impossibility, nor could an epic be composed in the meter of Shelley's *Ode to a Skylark*. Rhyme, meter, alliteration—all have a place in the making of poetry; and though occasionally a poet arises who, like Whitman, feels that he can dispense with verse form, the majority of readers as well as many critics will always feel a serious lack in his work.

Related Subjects. The following articles in these volumes will supplement the above brief discussion of poetry:

Acrostic
Aeneid
Alliteration
Ancient Mariner, The
Ballad
Beowulf
Biglow Papers
Canterbury Tales
Charge of the Light Brigade
Courtship of Miles Standish
Drama
Epic
Evangeline
Hamlet
Hiawatha
Idyll
Idylls of the King
Iliad
Lake School
Lyric Poetry
Macbeth
Meter
Midsummer Night's Dream
Mother Goose
Nibelungenlied
Ode
Odyssey
Paradise Lost
Pastoral Poetry
Rhyme
Sonnet
Spenserian Stanza

POETS

Addison, Joseph
Annunzio, Gabrielle d'
Arnold, Sir Edwin
Arnold, Matthew
Austin, Alfred
Blake, William
Blewett, Jean McKishney
Bradstreet, Anne
Bridges, Robert
Browning, Elizabeth Barrett
Browning, Robert
Bryant, William Cullen
Burns, Robert
Butler, Samuel
Byron, George Noel Gordon
Cameron, George F.
Campbell, Thomas
Campbell, William W.
Carleton, Will
Carman, Bliss
Cary, Alice and Phoebe
Catullus, Caius Valerius
Cawein, Madison J.
Chapman, George
Chaucer, Geoffrey
Coleridge, Samuel Taylor
Cowper, William
Crawford, Isabella V.
Dante Alighieri
Drummond, William Henry
Dryden, John
Dunbar, Paul Laurence
Emerson, Ralph Waldo
Field, Eugene
Fitzgerald, Edward
Fréchette, Louis Honoré
Gay, John
Gerin-Lajoie, Antoine
Gilder, Richard Watson
Goethe, Johann Wolfgang von
Goldsmith, Oliver
Gray, Thomas
Halleck, Fitz-Greene
Hayne, Paul Hamilton
Heavysege, Charles
Heine, Heinrich
Hemans, Felicia Dorothea
Herrick, Robert
Holmes, Oliver Wendell
Homer
Hood, Thomas
Horace
Howe, Julia Ward
Hugo, Victor Marie
Hunt, [James Henry] Leigh
Ingelow, Jean
Johnson, E. Pauline
Juvenal (Decimus Junius Juvenalis)
Keats, John
Key, Francis Scott
Kipling, Rudyard
Lamartine, Alphonse de
Lampman, Archibald
Langland, William
Lanier, Sidney
Larcom, Lucy
Le Gallienne, Richard
Lemay, Léon Pamphile
Longfellow, Henry Wadsworth
Loveman, Robert
Lowell, James Russell
Lucretius, Titus Carus
Lytton, Edward Robert Bulwer
Mair, Charles
Markham, Edwin
Martial, (Marcus Valerius Martialis)
Masefield, John
Masters, Edgar Lee
Meredith, George
Miller, Cincinnatus Heine
Milton, John
Moody, William V.
Moore, Thomas
Morris, William
Musset, Alfred de
Noyes, Alfred
Omar Khayyám
Ovid
Payne, John Howard
Peck, Samuel M.
Perry, Bliss
Pindar
Poe, Edgar Allan
Pope, Alexander
Procter, Adelaide Anne
Read, Thomas Buchanan
Riley, James Whitcomb
Rossetti, Christina Georgina
Rossetti, Gabriel Charles Dante
Ryan, Abram J.
Sachs, Hans
Sadi
Sappho
Saxe, John Godfrey
Scott, Sir Walter
Service, Robert
Shakespeare, William
Shelley, Percy Bysshe
Sidney, Sir Philip
Simms, William Gilmore
Simonides
Smith, Samuel Francis
Snorri Sturluson
Southey, Robert
Spenser, Edmund
Stanton, Frank L.
Stedman, Edmund Clarence
Stevenson, Robert Louis Balfour
Suckling, Sir John
Swinburne, Algernon Charles
Tagore, Rabindranath
Tasso, Torquato
Tegner, Esaias
Tennyson, Alfred
Theocritus
Thomson, James
Timrod, Henry
Uhland, Johann Ludwig
Van Dyke, Henry
Vergil
Voss, Johann Heinrich
Watts, Isaac
Whitman, Walt
Whittier, John Greenleaf
Wieland, Christoph Martin
Wilcox, Ella Wheeler
Willis, Nathaniel Parker
Wordsworth, William
Yeats, William Butler
Young, Edward

POETS' CORNER, a part of the south transept of Westminster Abbey which has been dedicated to the great poets of England. There are to be seen the tombs of Chaucer, Spenser, Dryden, Gray, Browning and Tennyson, while

memorials to these and other poets make the spot beautiful. A single American has been honored by having his bust placed in the Poets' Corner—Longfellow.

POINCARÉ, *pwaN ka ra'*, Raymond (1860-), President of France from 1913 to 1920, a leader of the Republic during the War of the Nations. Immediately after assuming his duties as President, in 1913, he appointed M. Delcassé ambassador to Russia. These two men are chiefly responsible for the formation of the Triple Entente, the friendly alliance of France, Russia and England. Before his election to the Presidency Poincaré had held the offices of Minister of Public Instruction, Minister of Finance and Premier of France.

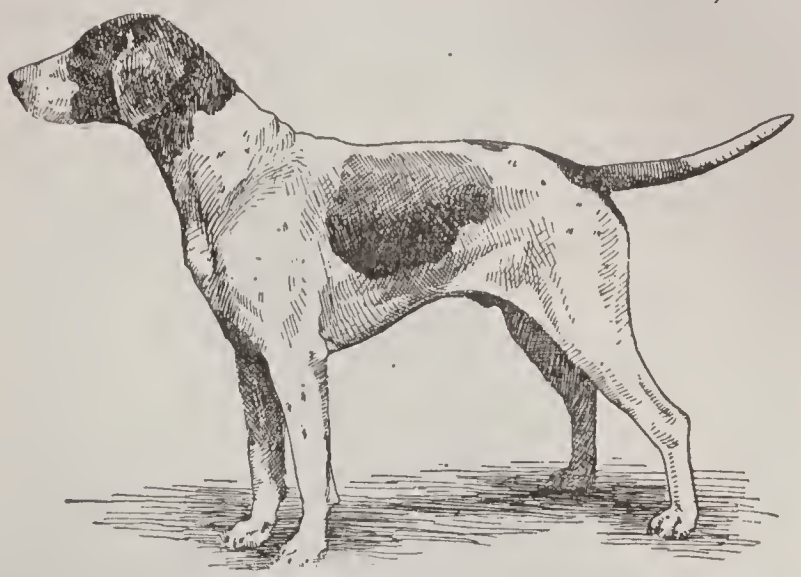
PRESIDENT RAYMOND POINCARÉ

M. Poincaré is a man of superior ability and energy, an author of prominence as well as one of the foremost lawyers of France, and since 1909 has been a member of the French academy. In 1920 he was elected to the Senate, and became Premier in 1921.

Consult Dawbarn's *Makers of New France;* Fullerton's *Four French Statesmen.*

POINSETTIA, *poin set'i a,* a tropical plant of the spurge family, named after Dr. Poinsett of Charleston, S. C., who introduced it to American horticulture about 1835. It is the gorgeous red foliage of the poinsettia that makes it so popular for decorations during the Christmas season. In the Southern United States the plant blooms in gardens from July to September, and grows to a height of two or three feet; the tall, woody stem bears lance-shaped leaves, the lower ones green, and those near the top bright red. The real flower is the yellow center of the brilliant scarlet foliage cluster. In the Northern states these plants are often cultivated in hothouses. See Spurge Family.

POINT'ER, a dog of the hound family, trained to stop at sight of game and point towards it with the nose. In a general way it resembles other members of the hound group. Its coat is smooth and short, the coloring being generally black and white, though some of the best pointers are entirely black. The pointer's trick of indicating the position of game birds is the result of a long course of training. It has a remarkably keen sense of smell, and



THE POINTER

can track out its prey rapidly and without mistake.

POISON, *poi'z'n,* a substance that, when taken into the body, causes illness or death. So general a definition, however, needs some modification. There are some substances that are not usually harmful in small doses but which it would be fatal to take in large quantities. This is true of many medicines. The age, condition of health and habits of individuals are all important factors in determining the effects of a poison, and so the term is a relative one. Poisons are sometimes classed as *irritants* and *nerve poisons.* Among the former, which burn or produce inflammation, bringing about local chemical changes, are strong mineral acids, caustic alkalies, various compounds of phosphorus and mercury; nerve poisons, which act on the nervous system and cause such symptoms as convulsions, delirium and stupor, include alcohol, belladonna, chloroform and strychnine. Still another class is the group of poisonous gases, which render the victim unconscious through lack of oxygen (see Asphyxiation). Modern science also classes disease germs as poisons, or as poison producers (see Disease, subhead *Germ Theory of Disease*). For a form of poisoning resulting from eating spoiled foods see Ptomaines.

Directions for overcoming the effects of poison taken by way of the mouth are given in full in these volumes under the heading Antidote. In case of dog bite (see Hydrophobia, subhead *Treatment*) the wound should be cleansed and cauterized and the patient be taken to the nearest Pasteur Institute for treatment. The same directions apply to snake bite. The poison from such wounds may be sucked out, but the person performing this service must be sure

that his mouth is free from sores or cuts. The poison should be at once spit out, and the mouth should be thoroughly washed. In all cases of poisoning summon a physician immediately, no matter what home measures are taken.

POISON IVY. See subhead in article Ivy.

POISONOUS, *poi'z'n us,* **PLANTS** are, generally speaking, those which are injurious in their effects, either when touched or when eaten. No sharp distinction can be drawn between poisonous and nonpoisonous species, however, as many plants which are harmful to some persons can be eaten by others without ill effects; others are poisonous in the native condition, but are harmless when cooked. The poisonous principle may be found in the seeds, foliage, fruit, roots or tubers.

Many standard medicines are prepared from plants generally regarded as poisonous. Poison ivy and poison sumac are among the most common of those plants poisonous when touched, though not all persons are affected by them. Belladonna, or deadly nightshade, is a flowering herb poisonous in all its parts, but highly valued for medicinal purposes. It belongs to the nightshades, a large family of plants containing many poisonous species. The jimson weed is a highly poisonous member of this family, and another representative is the tobacco plant. The family also contains such useful species as the potato and tomato, but the foliage and other green parts of the edible species often contain poisonous juices. The mushroom group includes both edible and poisonous species. A plant very harmful to cattle is the loco weed.

Consult "Thirty Poisonous Plants of the United States," in *Farmers' Bulletin No. 86,* prepared by the United States Department of Agriculture.

Related Subjects. The reader is referred to the following articles in these volumes:

Aconite	Ivy
Belladonna	Loco Weed
Digitalis	Mushrooms
Hellebore	Sumac
Hemlock	

POITIERS, *pwah tya',* one of the oldest towns of Western France, is associated with two famous battles. Near this town the Saracens were defeated by Charles Martel in 732, and in 1356, the French under King John II were routed by the Black Prince (see Edward, The Black Prince; Hundred Years' War). The town, now the capital of the department of Vienne, is built on a peninsula at the junction of the Clain and the Boivre rivers, fifty-eight miles southwest of Tours. Its narrow, crooked streets and picturesque houses, with their many historic or romantic associations, are typically medieval. Poitiers contains the oldest Christian church in France—Saint Jean's—and many other interesting churches and cathedrals. Among its antiquities are the ruins of Roman baths and the tombs of early Christian martyrs. During the Middle Ages, the town was the seat of government of the powerful counts of Poitiers and the royal dukes of Aquitaine. Their magnificent old palace is now the *Palais de Justice,* or courthouse. Population in 1911, 41,242.

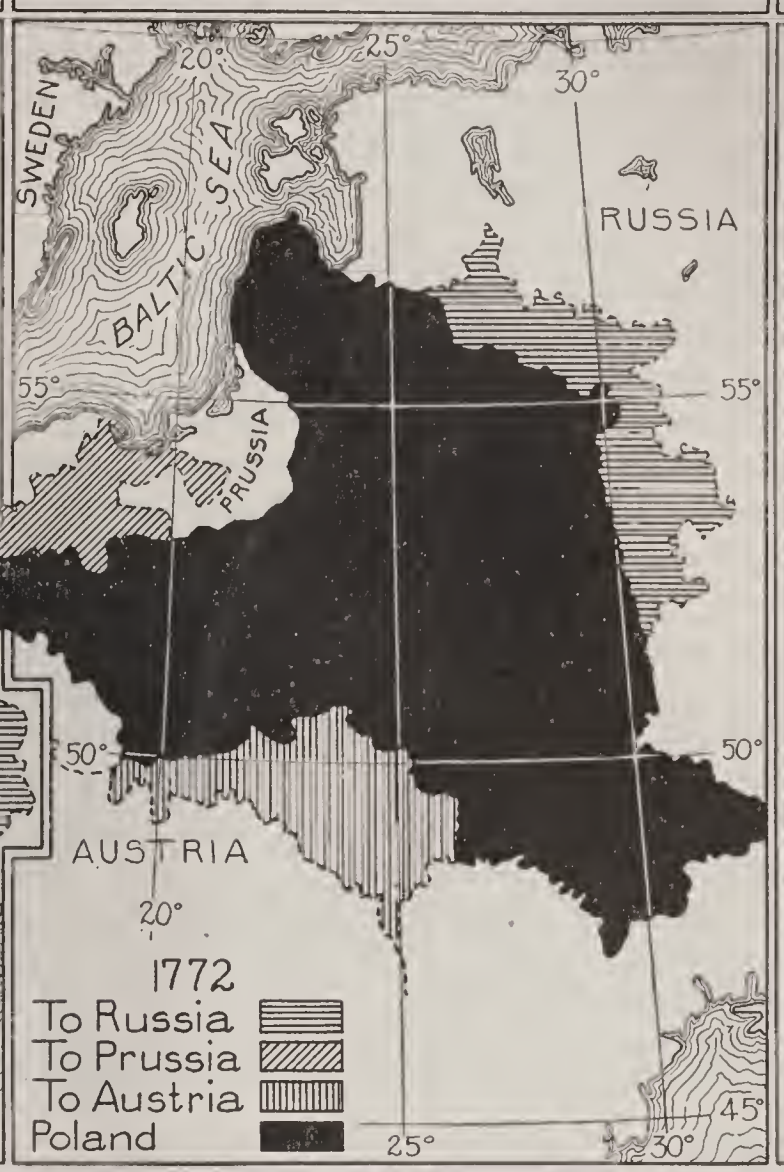
POKE'WEED, a tall, branching herb bearing white flowers and deep purple, juicy berries. A native of North America, it flourishes in waste places and along roadsides from Ontario to Florida and west to Texas and Minnesota. The stem grows from four to ten feet high, and in the fall, when the leaves are red and the berries ripe, the plant has a brilliant appearance. The berries are used to color wines, and when dried, together with the poisonous roots, they are put into medicines used in the treatment of skin and blood diseases and to relieve pain and inflammation. In some localities the young shoots are boiled and served like asparagus. Other names for the plant are *garget, pigeon berry* and *inkberry weed.*

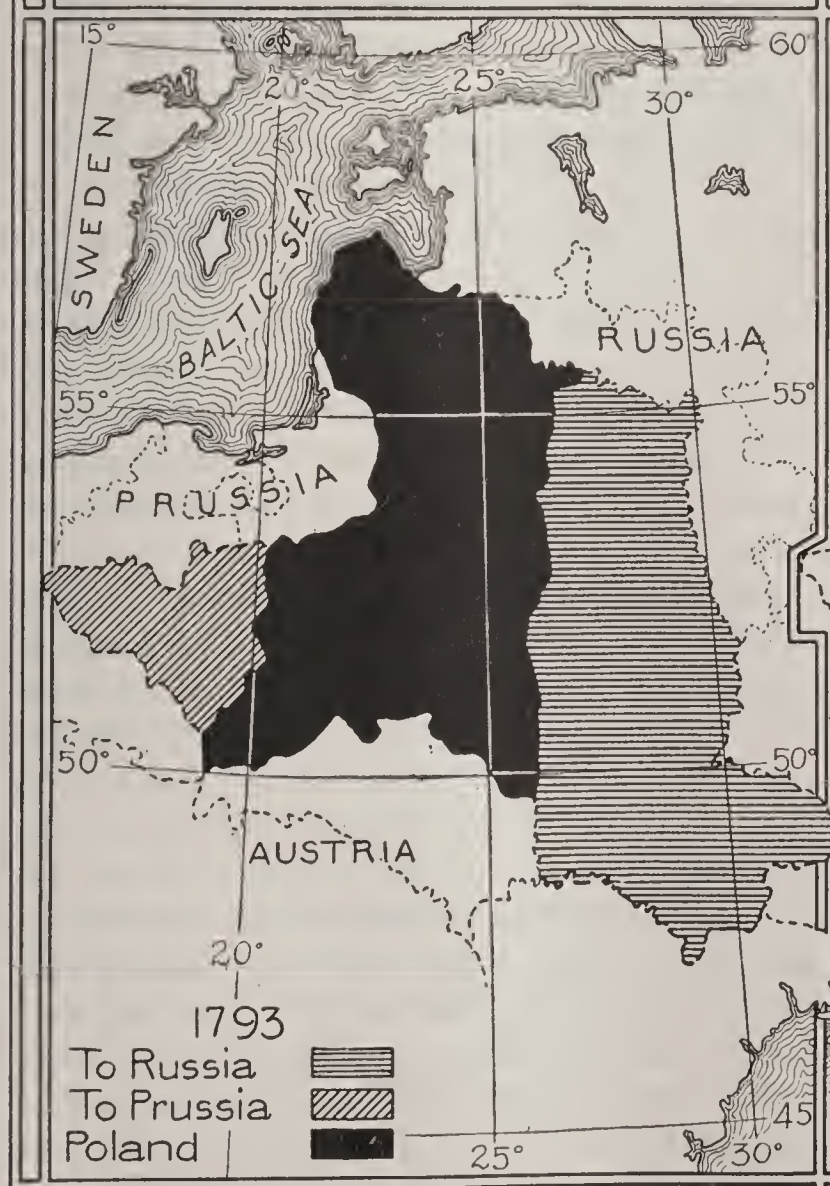
PO'LAND, a former kingdom of Europe which because of its position has been the unfortunate victim of the strong nations which surround it. Between 1772 and 1795 it was despoiled by Prussia, Russia and Austria and divided among those nations, who retained possession of their respective areas until near the close of the War of the Nations (which see). At the time of her greatest prosperity Poland had an area of 350,000 square miles and a population of over 11,000,000 most of whom were Slavs, with natural leanings towards the Russian people. In the final division of the kingdom Russia secured by far the largest share (see map, opposite).

Poland emerged from the war in 1919 an independent state and a republic, with practically all of its old-time territory returned to it. Behind it is the moral support of all the nations allied against the former Germanic powers.

History. During the early period of its existence the country was divided into small communities under the reign of Mieczyslaw I (962-992). These communities were united into the semblance of a nation. Mieczyslaw was a vassal of the German emperor, and he renounced

THE PARTITIONS OF POLAND





paganism for Christianity. During the reign of his successor, Boleslaw the Brave (992-1025), Poland became an independent kingdom, and its territory was enlarged. In succeeding reigns the country was involved in numerous wars with surrounding nations, but it continued to prosper until 1240, when it was invaded by the Mongols, who defeated the Poles, Silesians and Teutonic Knights in the Battle of Liegnitz (April 9, 1241). Poland was then divided into a number of independent principalities, and the dissensions among these petty states caused the loss of much territory. During this period Germans began to settle in the country and took a leading part in developing industries and municipal institutions. The country was restored under Ladislas I (1306-1333). He abolished many abuses and instituted the Diet, or legislative assembly. Under his successor, Casimir the Great (1333-1370), Poland increased rapidly in wealth and in power.

Casimir was succeeded by his nephew Louis, king of Hungary, whose daughter, Hedwig, became queen in 1384. Hedwig married Jagello, prince of Lithuania, and thus established the Jagellon dynasty, which continued to 1572. During this period Poland attained its highest point in wealth and influence. The kingdom extended from the Baltic Sea to the Dneister.

The last of the Jagellons died without an heir, and from that time the kings were elected by the Diet, which consisted of two houses—the Senate, composed of the chief nobles, and the Nuncios, or House of Representatives, composed of the inferior nobles. Owing to the jealousy of the nobles, the king was usually chosen from the royal family of some other nation, and a foreign king was not always in full sympathy with the people over whom he was placed. A number of Polish kings, however, were elected, and among the most noted of these was General Sobieski, who became king in 1674 under the title of John III. By his ability as a soldier and statesman Sobieski preserved his country for twenty years from being divided among foreign powers.

Partitioning of Poland. The seeds of dissension which led to Poland's downfall had been sown long before Sobieski's day. The condition of the country is thus described by Whitcomb in his *History of Modern Europe:*

> A weak state, lying between the rising powers of Russia and Prussia, Poland had little chance of preserving her nationality. The arrogance of her nobles and the faults of her constitution prevented her accomplishing the transition from a medieval to a modern state. Poland was a monarchy of twelve million people, ruled by a hundred thousand nobles, who lived from the labor of a degraded peasantry. There was no middle class, commerce being in the hands of the Jews, who possessed no political rights. The king was elected and a figurehead; a curious feature of the constitution was the *librum veto,* which gave the power to any member of the Diet to annul legislation. This alone was sufficient to make any government impossible, and the nobles were too selfish and stupid to permit a change.

A minor partition occurred in 1667, but what is known as the first partition was in 1772 and was deliberately planned by Frederick the Great of Prussia and Catharine II of Russia. Through their influence Poniatowski, a Polish nobleman, was elected king. His election led to anarchy in Poland, as the enemies of that country had foreseen. This disturbed condition gave Frederick and Catharine an excuse for intervention, which resulted in the appropriation of a portion of the country by each.

The second and third partitions took place during the French Revolution. The second partition was the result of an attempt of Poniatowski to revise the constitution and abolish the veto power. Catharine of Russia, fearing lest Poland should become a strong state, intervened in the interest of the nobles. William II of Prussia, while refusing to aid those favoring a new constitution, shared with Russia in again encroaching on Polish territory.

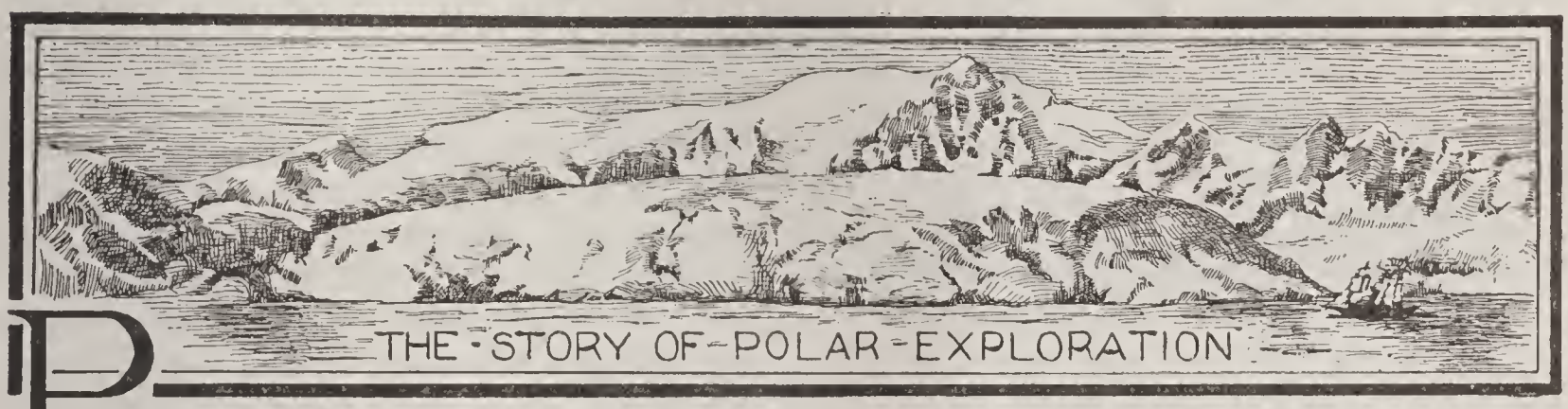
The third partition occurred in 1795. The Polish patriot Kosciusko refused to submit to the dismemberment of his country, and he led a national revolt. Poniatowski refused to support the movement, and Poland, divided against itself, fell an easy prey to its enemies. This time the armies of Russia, Prussia and Austria entered the country. Warsaw, the capital, was occupied, the king was forced to abdicate, and all Poland was divided among the invading powers, which retained possession of their respective territories until 1914.

Poland and the War of the Nations. In 1914 Poland was invaded by German and Austrian forces, but the invasion was checked by Russian arms before Warsaw was reached. In the summer of 1915 a German "drive" under Von Hindenburg captured Warsaw and drove the Russian army out of the country. Since the retreating Russians devastated the country, so that the enemy might derive no subsistence from it, the people were left in a most wretched condition. Their distress increased with every year of the conflict, and thousands perished of ill-treatment and starvation, in spite of heroic efforts in their behalf.

At the outbreak of the war the czar promised Poland self-government if it would remain loyal to Russia. After the country came into the possession of the Germanic powers, the emperors of Austria and Germany, in November, 1915, issued a proclamation promising an independent kingdom of Poland, but the proclamation did not include the parts occupied respectively by Germany and Austria. These efforts to retain their interests came to naught with allied victory. The Poles proclaimed a republic; they were heard at the peace conference, where they presented claims for an enlarged Poland. An outlet to the sea was given at Danzig, and the boundaries were to be extended to embrace nearly all the Poles of Europe. These were established in September, 1920. On January 26, 1919, the first election in Poland in 140 years was held, to choose delegates to a national assembly. The republic successfully withstood strong bolshevik influences from Russia, and early in 1921 adopted a liberal constitution, democratic in character. The area of the new Poland is 149,042 square miles; the population in 1920, 24,272,349. E.D.F.

Related Subjects. The reader who is interested in Poland will find further related material in the following articles in these volumes:

Catharine, subhead Catharine II (Russia)
Frederick, subhead Frederick II (Prussia)
Galicia
John III
Kosciusko, Thaddeus
Prussia
Russia
War of the Nations
Warsaw



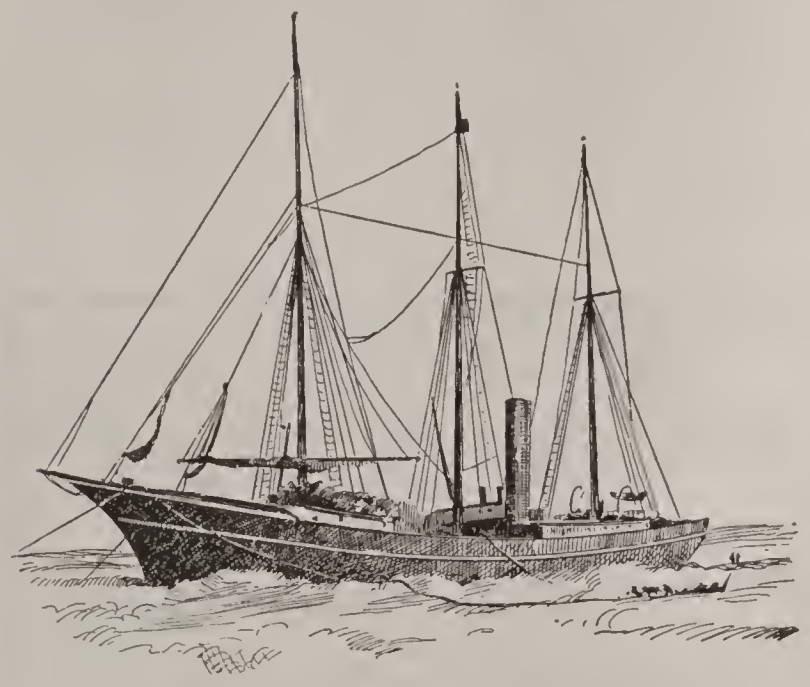
POLAR EXPLORA'TION. From earliest times the polar regions have exercised a fascination that has proved an almost irresistible call to adventurous men of many nations, who have risked, and in many cases lost, their lives in voyages of discovery. The ancients did not suspect the existence of the Poles; to them the regions of the North and South were mysterious zones of uninhabitable, frozen land and sea. Astronomical study led to the conviction that in the polar regions the sun must shine at midnight in midsummer and not at all in midwinter. The knowledge that the earth was round appears to have been lost for a time, and in the Middle Ages in European countries it was considered absurd, even impious, to believe in the roundness of the earth, and scholars believed it to be flat. When, however, the theory of the rotundity of the earth was clearly proved, attention was again more forcibly drawn to the Poles. It was always toward the north that men's thoughts turned, and vague and manifold were the traditions concerning the North Pole. Explorers set out to search the frozen north. Centuries before attention was seriously drawn to the South Pole, the Arctic region had been visited by adventurers. The South Pole lacked the attraction offered by the search for the Northwest Passage, the account of the search for which is given at length in these volumes. The final discovery of the North Pole was the result of ages of adventurous expeditions, while the discovery of the South Pole was the quick result of expert observation and scientifically-prepared expeditions.

Arctic Explorations

Discovery of the North Pole. After repeated attempts by other explorers, the North Pole was located by Commander Robert E. Peary of the United States navy, on April 6, 1909. Peary had spent nearly a quarter of a century in Arctic exploration, and his achievements entitle him to rank with the foremost explorers of his day. Peary's successful expedition left New York in the steamer *Roosevelt* in July, 1908, and on August 8 reached the most northerly inhabited point in Greenland. In command of the *Roosevelt* was R. Bartlett, who had had great experience in navigating Arctic seas with previous expeditions.

During the winter of 1908 supplies were transported to Cape Columbia, from which the final dash to the Pole was to be made. Commander Peary's long experience in Arctic regions proved invaluable. The Eskimos he had employed were picked men, who knew and trusted him; the dogs with which he was provided were the best to be obtained in Greenland.

The party left Cape Columbia in six divisions at intervals of one day. The total consisted of seven white men, nineteen Eskimos, 140 dogs and twenty-three sledges. Peary saved himself



THE "ROOSEVELT"
Peary's vessel, used in his final and successful effort to reach the North Pole.

as much as possible for the final dash and sent back, one after another, five of the six divisions, himself pushing on with four Eskimos. On April 6, the Pole was reached; careful observations were taken to place the attainment beyond all doubt, and the return journey commenced. From Indian Harbor, which was reached on September 5, 1909, Peary telegraphed, "Stars and Stripes nailed to the North Pole."

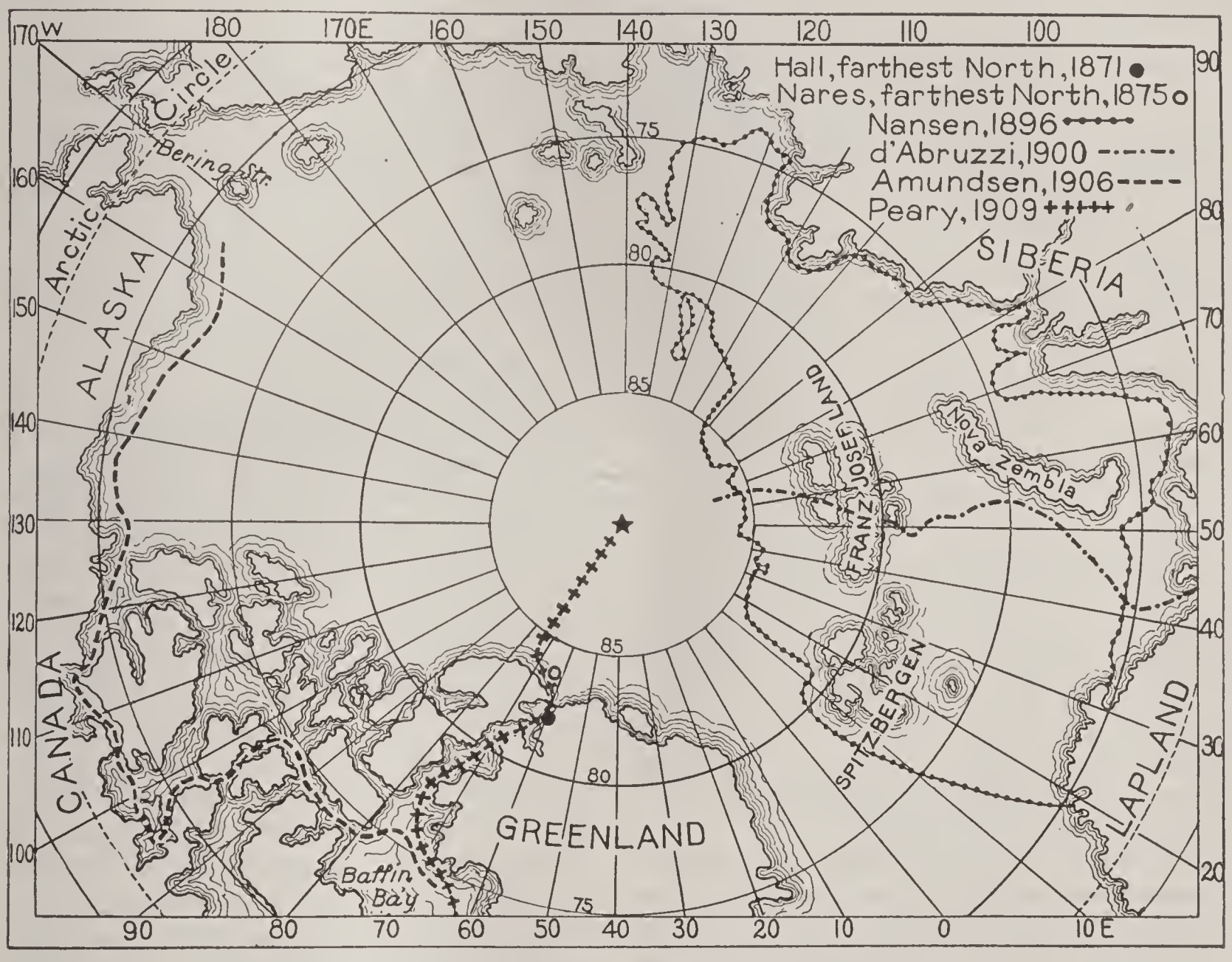
Captain Cook's Expedition. Five days previous to the receipt of Peary's telegram announcing his success, Dr. Frederick A. Cook of Brooklyn announced in cable dispatches from Arctic lands that he had reached the North Pole a year before Peary, on April 21, 1908. This news came as a complete surprise; at first his claim was accepted as authentic, but soon, under fire of Peary and his friends, Cook's exploit was publicly questioned. Dr. Cook submitted evidence of his achievement, which was not found satisfactory. A controversy was waged for some time, Cook maintaining his right to be acknowledged as the discoverer. The University of Copenhagen, after investigation, decided that his claim was invalid. Dr. Cook did not dispute the decision, which was promptly accepted by the scientific world, leaving Peary in possession of the high honor.

Scientific Results. While the discovery of the North Pole has not achieved the result long sought for (the opening up of a Northwest Passage, since this passage was discovered in 1905 by Roald Amundsen), it has accomplished much that is of value to the scientific world. The geological formation of the lands nearest to the Pole has proved the correctness of the theory long held by many that at some time in the earth's history the Arctic regions enjoyed a genial, if not almost tropical, climate. Almost every geological formation is represented, and the remains of plants and animals that could not have existed in any but a temperate climate have been discovered. No great mountain range runs through the Arctic region, which contains only one active volcano, on the small island of Jan Mayen. Around the Pole itself there is no continent such as exists at the South Pole. Soundings taken through the ice by Peary's party revealed a depth of 1,500 fathoms (9,000 feet), without touching bottom.

It was discovered that the temperature in the immediate vicinity of the North Pole is not as low as in surrounding territory nearer the continents. The lowest temperature ever recorded on the earth's surface is that experienced at Verkhoyansk in Siberia, where the thermometer registers —70° F. every winter, and sometimes shows a temperature of —93°. It has been calculated that the temperature at the North Pole seldom, if ever, goes below —42° F., which is not the degree of cold experienced in many parts of Canada every winter. Peary reported that in the far North the ice becomes more even, and less difficult to travel on, than near the land. This would suggest that nearer the Pole the atmosphere is calmer and not subject to the disturbing storms that render the sea ice farther south so irregular and difficult to cross.

History of Arctic Exploration. About 325 B.C. an adventurous Greek named Pythras sailed from Marseilles, then called Massalia, on a voyage of discovery. He reached the land of the midnight sun and the Arctic Circle. Early in the ninth century Iceland was discovered, and in the same century Eric the Red found Greenland, where a settlement was established. These were, however, merely voyages of discovery, and had no direct connection with the North Pole, although they naturally turned attention to regions farther north.

Later, men devoted themselves to search for a possible passage along the coast of North America, westward to India and Asia. The first to set out to discover this passage was John Cabot, in 1497. Sebastian Cabot, Frobisher, Davis and others followed; Barents, the great Dutch navigator, reached Nova Zembla; Hudson explored Hudson Bay and surrounding waters in 1609 and 1610. During the eighteenth century Arctic waters were frequented by whaling vessels, but little was done in the way of



PEARY BROUGHT TO AN END CENTURIES OF ENDEAVOR

and was followed in 1871 by Hall, who penetrated to latitude 82° 16′ N., but died on his return. In 1875 Nares reached latitude 83° 20′ N., in Grinnell Land, where later stations were established for the purpose of making a scientific study of magnetic and climatic conditions. Nils Adolf Eric Nordenskiöld sailed eastward from Tromso toward Bering Strait, and in 1879 actually passed through the Northeast Passage and reached Yokohama, by way of the northern coast of Asia.

scientific exploration. In 1845 an expedition set out under Sir John Franklin for the purpose of discovering the Northwest Passage. For ten years no news or trace of this expedition was found, though repeated attempts were made. Numerous expeditions were sent out from England and the United States to ascertain the fate of Franklin and further to explore Arctic regions.

Doctor Elisha Kent Kane, commander of an expedition for the rescue of Franklin, gave the first systematic and popular account of the polar regions. Hayes, who had previously accompanied Kane, reached latitude 81° 35′ N.

Lieutenant De Long of the United States navy entered the Arctic Ocean through Bering Strait in 1881, but his ship was crushed by ice, and it sank. One of the most important of all polar expeditions, previous to Peary's, was that commanded by Fridtjof Nansen in the specially constructed *Fram,* which reached 86° 14′ N. in 1896.

The expedition commanded by the Duke of Abruzzi reached latitude 86° 33′ N. in 1900, but Cagni, who was in command of the party, found it impossible to proceed farther. Captain Roald Amundsen in the sloop *Gjoa* sailed through the Northwest Passage in 1905. He

entered the Arctic Ocean through Davis Strait, went westward across Lancaster Sound and finally reached Bering Strait. The *Gjoa* was the first vessel to pass from ocean to ocean north of America. Even though Amundsen's achievement was notable, no commercial gain will ever accrue from it, as boats will never attempt the perilous journey. He had the pleasure, however, of bringing to an end the search which had continued for centuries.

A few disastrous attempts to reach the Pole by aerial navigation have been made, the most notable being that of Andrée, a Swedish engineer, who embarked with two companions in an ordinary balloon, starting from Spitzbergen in 1897. Nothing was ever heard of the fate of the three men, or of the balloon. In 1909 Walter Wellman, of the Chicago *Record-Herald,* made an unsuccessful attempt to reach the Pole in a dirigible balloon. B.M.W.

Antarctic Exploration

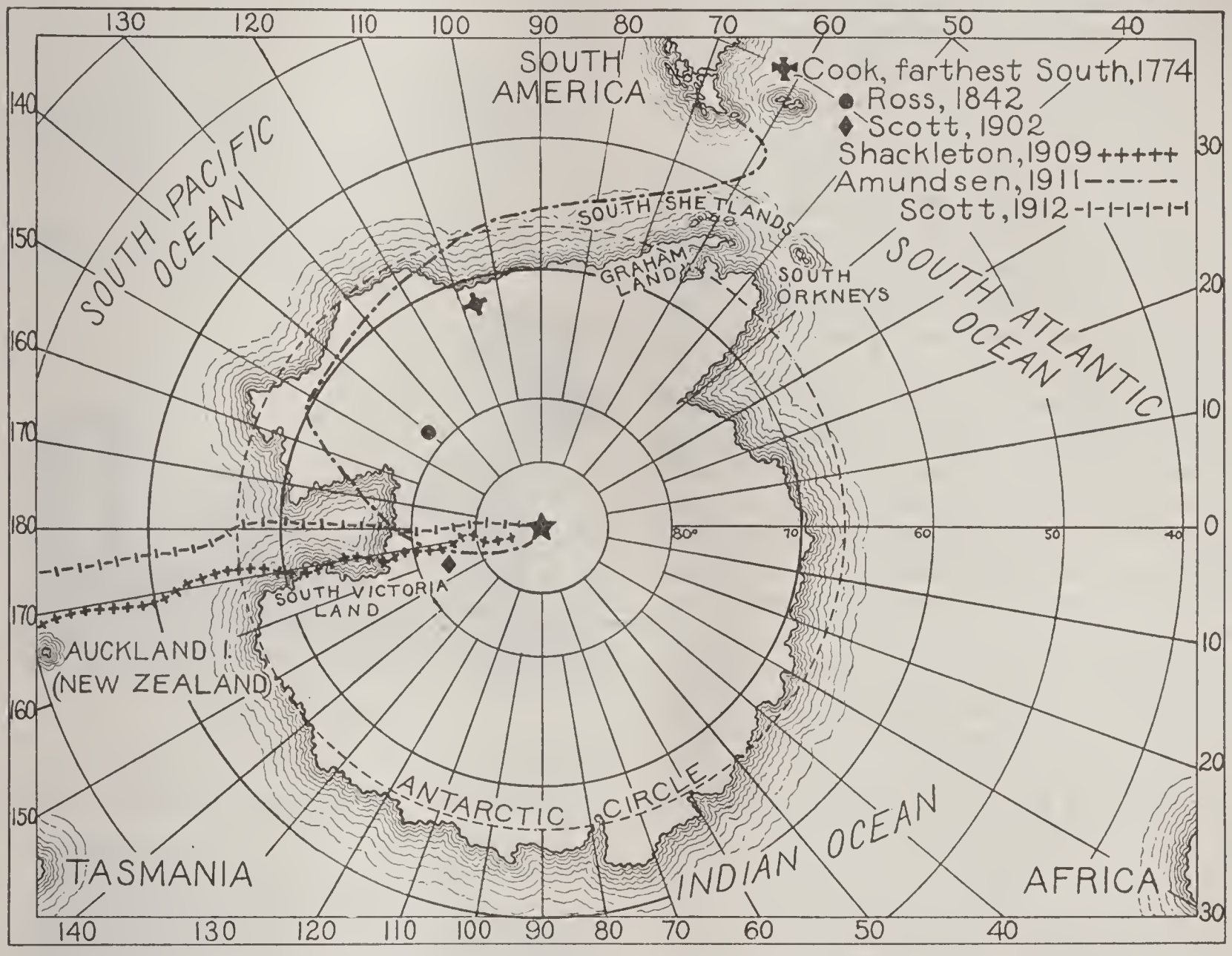
Discovery of the South Pole. The discovery of the South Pole was achieved more quickly than that of the North Pole, but it demanded no less skill and hardihood on the part of those who sought it. The mystery of the South Pole was practically solved by an expedition under Lieutenant (now Sir) Ernest H. Shackleton in 1909, though the Pole was not reached. Another expedition was fitted out in 1910, under the command of Captain Robert F. Scott. In 1910 the Norwegian navigator, Roald Amundsen, already famous in Arctic annals, also embarked on a similar expedition. Amundsen by a quick dash that astonished the world reached the Pole on December 16, 1911, and returned to civilization early in 1912, with the story of his success, for which the scientific world has loaded him with honors. Captain Scott and four of his companions reached the Pole by another route on January 18, 1912, a month too late to gain credit for the discovery. On the return journey Scott and four of his companions lost their lives, after terrible sufferings from cold and hunger.

History of Antarctic Exploration. Captain James Cook was the first man known to have sailed across the Antarctic Circle. On January 30, 1774, he reached latitude 71° 10′ S., over 4° S. of the Circle. Vessels sailing round Cape Horn had constantly met with adverse winds which drove them out of their course into the icy Southern seas, with the result that many of the original discoveries of Antarctic lands were accidental. In fact, all such discoveries recorded previous to 1750 must have been the result of misadventure. Alexander I of Russia, in 1821, sent out an expedition, the results of which were highly important. It consisted of two vessels under the command of Bellingshausen, who discovered land which was named Peter the Great and Alexander islands. In 1831 Biscoe started from the Sandwich Islands, now Hawaii, to look for new islands, and found Enderby Land, and in 1833 Kemp discovered Kemp Land. In 1839 Balleny discovered a group of five islands known as the Balleny group. An English expedition under James Clark Ross in 1842 entered the Antarctic Circle in latitude 78° 10′ S., the lowest southern record until 1900. A French expedition under Dumond D'urville found traces of what was believed to be a continuous coast from 136° to 142° E., and to it gave the name of Adélie Land.

Recent Expeditions. In 1872 a scientific expedition was sent out by Great Britain under the command of Sir Wyville Thomson, in the *Challenger.* The expedition carried out extensive surveys and explorations, remaining below the Antarctic Circle until 1876, penetrating in 1872 to 66° 40′ S. The *Challenger* was the first steamer to cross the Antarctic Circle. In September, 1894, the Norwegian whaler *Antarctic* sailed from Melbourne, Australia, and landed a party at Cape Adare, the first people to set foot on the Antarctic continent. Borchgrevinek, the Norwegian scientist, with the British Antarctic Expedition of 1898-1900, reached latitude 78° 50′ S., only 800 miles from the Pole, located the south magnetic pole and returned with the most valuable and reliable information thus far obtained concerning the region.

In 1901 three important expeditions were sent to the Antarctic Circle by the German, Scandinavian and British governments, respectively. Captain R. F. Scott, above mentioned, who lost his life after his successful attempt to reach the Pole in 1912, was in command of the British expedition, which had for its object geographical discovery and exploration. Professor von Drygalski was in command of the German party, with instructions to study life and magnetic phenomena. The Norwegian scientists were to study all conditions and phenomena. Captain Scott established quarters near Mount

Erebus and spent two winters in the region, approaching nearer to the Pole than any previous explorer had been able to do. The German expedition, after spending one winter in scientific research, was recalled, having relocated the south magnetic pole and gained much scientific information. The Swedish expedition, located the south magnetic pole, while the third ascended Mount Erebus. Shackleton's expedition demonstrated that the interior of the continent is a high plateau, in some places with an elevation of 10,000 feet, covered to an enormous depth with ice. In 1914 it was decided to send Shackleton south again, and though the



AMUNDSEN AND SCOTT STOOD WHERE EVERY DIRECTION IS NORTH

led by Nordenskiöld, a nephew of the discoverer of the Northeast Passage around Asia, spent two winters on the borders of the Antarctic Circle. While on the way to pick up the party which had made a long southerly march on skis, the ship was lost, leaving the scientists in desperate condition on the ice. The Argentine gunboat *Uruguay,* however, made a brilliant dash to the rescue and brought back the entire party. Captain Scott's party returned safely in the *Discovery* in 1904.

Expeditions of Sir Ernest Shackleton. The most notable of all Antarctic expeditions up to that time was one led by Sir Ernest Shackleton in 1908-1909. Dividing his party into three sections, Shackleton himself penetrated the interior of the Antarctic continent to within 111 miles of the Pole, when he was forced to return because of lack of supplies. Another party reoutbreak of the War of the Nations delayed preparation, and it was thought the expedition would have to be abandoned, it finally started as originally intended.

On December 6, 1914, Shackleton sailed from South Georgia, an island group in the South Atlantic, in the ship *Endurance.* In February the vessel became involved in a huge pack of floating ice, which carried it onward in an irregular course for months, until in October, 1915, the *Endurance* was crushed (69° 5′ S., 51° 32′ W.). The party had to establish quarters on the drifting ice pack, and there they remained for six months warding off starvation by eating dogs and seals. In April, 1916, the pack began to break up, and the men embarked on the perilous sea in small, open boats. After a voyage of ten days, in which they endured incredible hardships, they landed on Elephant

Island, a dreadful, glacier-covered stretch of land, exposed to the fiercest storms and without an inhabitant. With a heroism unsurpassed in the annals of polar research, Shackleton and five volunteers set out on a relief expedition, navigating the wild sea in an open boat twenty-two feet in length. On the tenth of May they disembarked safely on the west shore of South Georgia, made an overland trip across ice-covered mountains, and on May 31 reached a Norwegian whaling station. Three times a rescue ship set sail to relieve the men on Elephant Island, and each effort failed. The undaunted Shackleton, however, refused to be defeated, and finally, on August 30, 1916, in the Chilean steam yacht *Yelcho,* reached the marooned travelers, all of whom he found alive. They had conserved their food supplies by killing penguin, shellfish and seal.

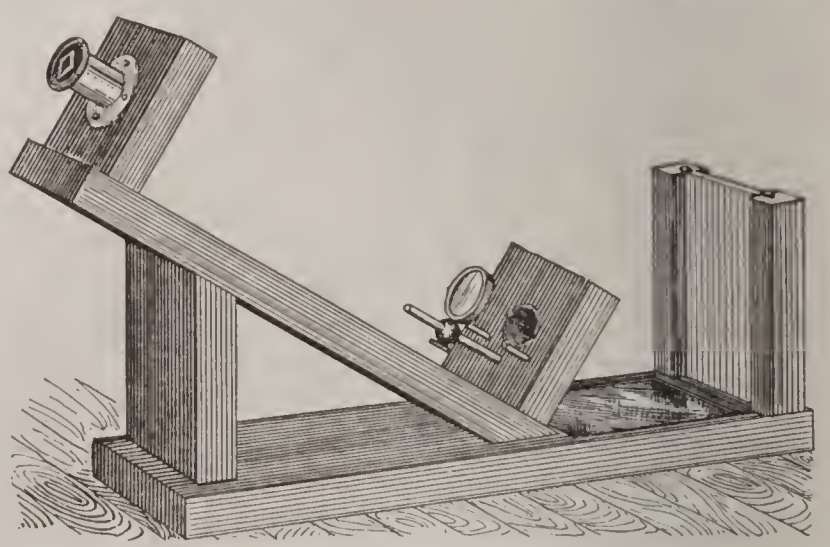
Meanwhile a supporting expedition under Captain E. Mackintosh had sailed in the *Aurora.* The purpose of this company was to lay supply depots on Ross Barrier (see map, page 276) for the use of Shackleton's party, which had expected to reach Cape Evans on June 1, 1915. Captain Mackintosh and several men went ashore, while the rest of the party remained on the *Aurora,* which was anchored to the ground ice at Cape Evans. On May 6, 1915, the *Aurora* was loosened from its moorings by a terrible blizzard and was swept out to sea. After drifting in the ice for many weeks the vessel reached Australia. The men left on Ross Barrier continued their work of laying supply depots. This they accomplished with almost superhuman courage, for they were beset by furious blizzards. Moreover, scurvy attacked the party and rendered some of them helpless, Captain Mackintosh and two of the men dying from the effects of the hardships. In December, 1916, Shackleton started on a relief expedition from New Zealand in the *Aurora.* He arrived at Cape Evans on January 10, 1917, rescued the survivors and arrived at Wellington, New Zealand, on the fifth of February. Thus ended one of the most thrilling chapters in the history of polar explorations. B.M.W.

Consult Scott's *Scott's Last Expedition;* Amundsen's *The South Pole: An Account of the Norwegian Antaretie Expedition in the Fram 1910-1912;* Shackleton's *Heart of the Antaretie;* Peary's *Nearest the Pole;* Cook's *My Attainment of the Pole;* Greely's *Handbook of Polar Discoveries* (5th edition).

Related Subjects. The following articles in these volumes contain much that will be of interest in connection with the subject of polar exploration:

Abruzzi, Duke of the
Amundsen, Roald
Antarctic Lands and Seas
Arctic Lands and Seas
Cabot, John and Sebastian
Challenger Expedition
Cook, Frederick A.
Cook, James
Earth
Franklin, Sir John
Frobisher, Sir Martin
Hudson, Henry
Kane, Elisha Kent
Nansen, Fridtjof
Nordenskiöld, Nils A. E.
Northwest Passage
Parry, Sir William E.
Peary, Robert E.
Pole
Ross, Sir James Clark
Scott, Robert Falcon
Shackleton, Sir Ernest H.
Stefansson, Vilhjálmur

POLARISCOPE, an instrument for producing and testing polarized light. Polarization of light (which see) is a process by which vibrations of light rays are made to take a single direction. The simplest polariscope is a crystal



A POLARISCOPE

of Iceland spar or a crystal of tourmaline. The polariscope may be made by mounting crystals of these minerals so that they can be inserted in the tube of a microscope in place of the eyepiece, or a separate apparatus may be used. The upper tube can be turned so that the axes of the crystals are placed at right angles when the polarizing effect on the object viewed is seen. This instrument is sometimes used for testing the quality of sugar (see last sentence, article Polarization of Light).

POLARIZA'TION OF LIGHT. Were it possible to look at the end of a magnified ray of light it would be seen to resemble the end of a sawed-off log or branch after it had become dry. That is, there would be innumerable lines radiating from the center of the ray, like the little cracks that radiate from the center of the end of the branch (Fig. 1). Scientists know this supposition to be well founded, because they have proved beyond doubt that the ether waves which propagate light vibrate at right angles to the direction in which the ray travels. White light is composed of all the colors of the spectrum (see Light), each color being due to different wave lengths. All these waves pass

through most transparent substances without obstruction. But a few substances, especially tourmaline (which see) and Iceland spar, obstruct some of the vibrations.

Allow a ray of light from the sun or a lamp to pass vertically through a crystal of tourmaline in a dark room and fall upon a screen.

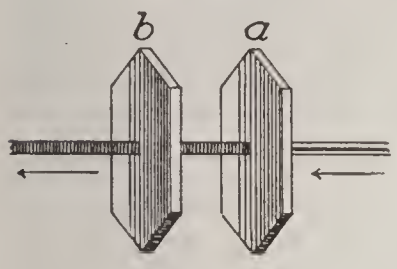


FIG. 1

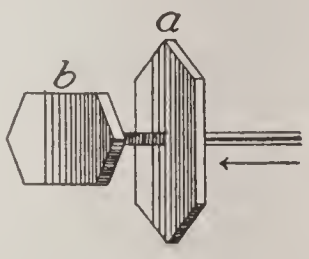


FIG. 2

In the first figure light is passed through tourmaline crystals *a b*. In the second figure light is cut off by crossed tourmaline crystals.

There is no apparent change in the light. Place another crystal of tourmaline between the first and the screen so that the surfaces of the two crystals are parallel. Revolve the second crystal about an imaginary horizontal axis. At two points in the revolution, 180° apart, some of the vibrations will be obstructed, and this change will be shown on the screen. Fig. 2 is an illustration of what occurs. The tourmaline allows the transverse vibrations of light waves to pass through it in one direction only. This limitation of light waves to a single direction is called *polarization of light.*

Iceland spar (which see) has the property of polarizing light by double refraction; that is, it

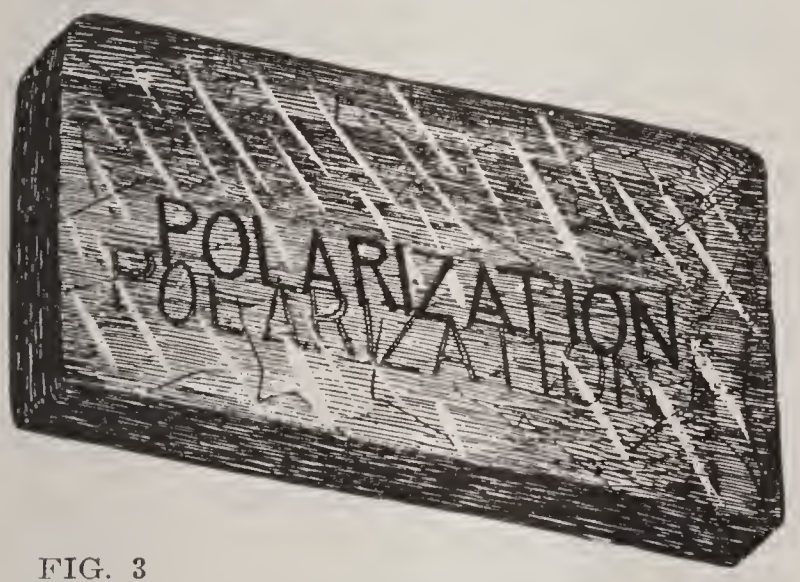


FIG. 3

separates the rays of light into the ordinary and the polarized, or *extraordinary,* rays. Objects seen through a crystal of Iceland spar appear double, as shown, in Fig. 3. Light may also be polarized by reflection from such surfaces as glass, water and other nonmetallic substances. The polarization may be recognized by the rainbow tints appearing on the reflecting surface. Soap bubbles produce a similar effect. The effect is not produced unless the light strikes the reflecting surface at the proper angle, which is known as the *angle of polarization.* The angle varies for different substances.

Some transparent substances turn polarized light to the right and others turn it to the left. This fact is sometimes used for detecting the adulteration of sugar. Cane sugar turns the light to the right and fruit sugar turns it to the left, and by subjecting a sample of sugar to the test of polarized light the proportion of fruit sugar is easily detected. See POLARISCOPE.

POLE, either end of the axis about which the earth turns. The northern extremity, which is ninety degrees north of the equator, is called the North Pole; the South Pole occupies a corresponding position at the southern end. Astronomers use the term *celestial pole* to designate that point in the heavens at which the earth's axis points and about which the stars appear to revolve. The star nearest this point in the northern heavens, called the Polestar, is used by sailors in keeping their direction on the sea. In a broad sense, the term *pole* may be used to designate a point on any sphere situated as the earth's poles are to the equator. Thus, the poles of the horizon are the zenith and the nadir. In physics the term is used to designate the points of a body at which its attractive or repulsive force is concentrated. The magnetic poles of the earth are points on the surface where the magnetic needle is vertical, or upright (see MAGNET AND MAGNETISM).

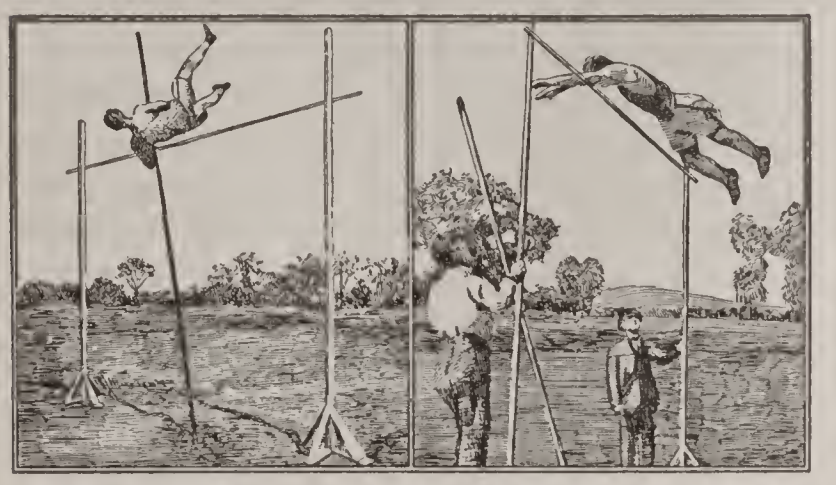
POLE'CAT, an animal belonging to the weasel family, closely related to the skunk of North America. It was once widely distributed throughout Europe, but is now being exterminated in many places because of its destructive habit of feeding on domestic fowls of various sorts, as well as on rats, mice, eggs and wild birds. In common with the skunk, it secretes, and can discharge at will, a liquid of a most

THE POLECAT

disagreeable odor. The common variety is about seventeen inches long, with a tail six inches in length. Its coarse brown fur, turning black below, is used for artists' brushes. The American skunk is sometimes incorrectly called polecat.

POLE'STAR, a name given to the North Star, the brightest in the constellation Ursa Minor, or Little Bear. It is described in the article NORTH STAR, and its position is shown in the illustration accompanying the article ASTRONOMY, page 445.

POLE VAULT, a sport which consists in leaping over a horizontal bar with the aid of a pole. The aim is to clear an easily dislodged bar, supported by two uprights. The vaulting pole, made of light, tough wood, is from thir-



POLE VAULTING

teen to fifteen feet in length. The vaulter, having measured the height of the bar, takes an undergrip with his right hand about six inches above this point. The left hand, with an undergrip, seizes the pole at a little over a foot below the right. The vaulter approaches the crossbar at a run, rests the end of the vaulting pole in the turf about eighteen inches from the bar, and lifts himself into the air while thrusting his legs forward with the aid of the pole. He must go over the bar without dislodging it. The world's amateur record for this event, made in 1912, was thirteen feet two and one-fourth inches (height of vault).

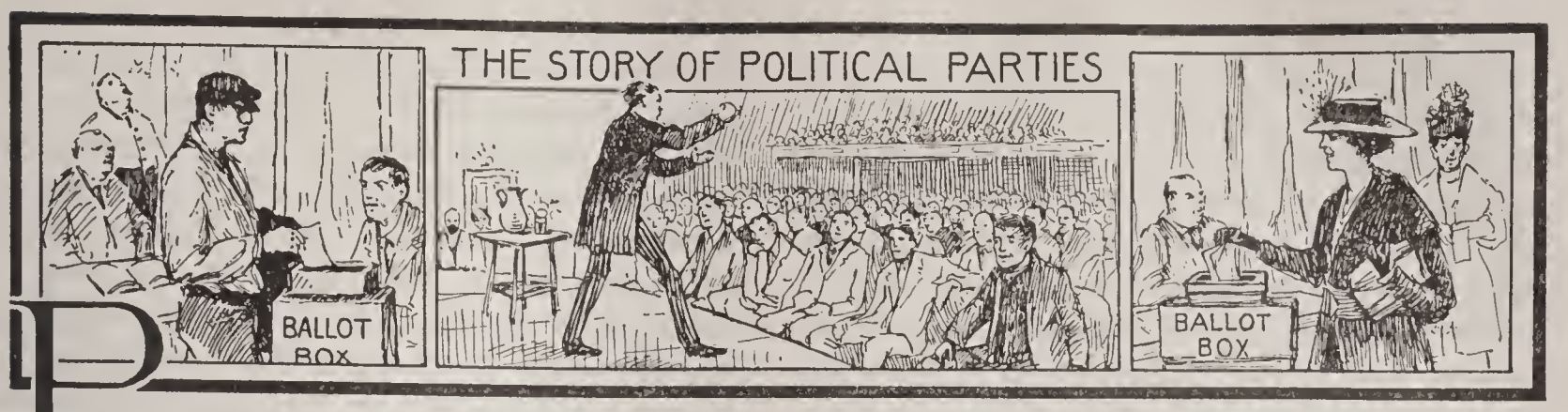
POLICE, *po lees'*, in modern practice, a body of trained men, organized to protect life and property and to maintain order. Governments have two primary uses—to preserve order within their borders and to protect their people from foreign foes. Thus the police perform one of the chief services of government. The control and organization of police differ considerably in various countries. In Paris and Berlin the organization is distinctly military, control being vested in a Cabinet officer. On the continent of Europe such organization is quite general, while in England police commissioners are named by the Crown. In the United States and Canada, on the contrary, the police are ordinarily under the control of the municipal authorities, and are organized as a part of the local government. Pennsylvania has long had a successful state police system in operation, and New York followed the example of its sister state in 1917, but in the other commonwealths state laws are usually enforced by county or municipal officers.

Of late years, with the growth of great cities, many other duties have been imposed besides the preservation of order. The police no longer confine their activities to dealing with criminals and preventing crime. They concern themselves with keeping their districts sanitary, inspecting buildings which may be unsafe, investigating nuisances of all sorts, and seizing and condemning spoiled food supplies. In some of the larger cities they exercise a sort of moral censorship, forbidding the production of plays regarded as objectionable and inspecting moving-picture films, in addition to seeing that public dance halls and similar resorts are run in an orderly fashion.

Organization in America. The police in American cities are organized under a chief, commonly appointed by the mayor or board of commissioners. He has under him a considerable force directed by subordinates of graded rank—usually inspectors, captains, lieutenants and sergeants. With the exception of the head, the department members are commonly under civil service and may spend their lives in the employ of the city. For convenience of administration, a city like New York or Chicago is divided into many police districts and subdistricts, each district being in charge of a commanding officer of the rank of inspector or captain, who must answer to the department head for inefficiency or want of energy in preserving order. It is the business of the captains and lieutenants, the next lower grade of officers, to direct the patrolmen and detectives assigned to the station, and to follow the details of criminal investigation. The detectives are often referred to in America as "plain-clothes" men, because they do not travel in uniform, as do regular patrolmen. It is their business to know the haunts and habits of felons of all degrees, and to anticipate and foil as much roguery as possible.

Women have recently been added to the police in America, especially in the West. Soon after they were admitted to the service, Chicago employed twenty-one policewomen, thus heading a list that included Los Angeles, San Francisco, Saint Paul and about twenty other cities. G.B.D.

POLITICAL ECONOMY, *po lit'i k'l e kon'o mi,* a term for which the word *economics* has been largely substituted. See ECONOMICS.



POLITICAL PARTIES. Although a political party is not a part of a government, yet it is in fact a second or unofficial government. The party in power at any one time is actually directing the legal machinery of government. The President of the United States or the Premier of the Dominion of Canada is also, as a rule, the recognized leader of his party. If he has not been recognized as the leader, he has usually failed to carry through important legislation and has, perhaps, failed in attaining most of his other objects. The party system, therefore, is sometimes described as a link between the executive and legislative branches, for the executive's success in office depends on his identification with his party.

Political Parties in the United States

The party system in the United States has five main objects, or lines of attack. Briefly stated, these are as follows: (1) to influence government policy; (2) to form public opinion; (3) to win elections; (4) choose between candidates for office; and (5) procure salaried posts for party leaders and workers. One of these, the last, is not always admitted as an object, and especially in recent years it has met strong opposition. The fourth of these objects, the election of public officers, is almost entirely peculiar to the United States. In some other countries a few officers are chosen by vote, but nowhere to such a degree as in the United States. With comparatively few exceptions, every public officer in the United States, from the President to the village constable, is elected by a party vote.

So widespread, indeed, is the party system, that it may be said without exaggeration that all elections, even those which have nothing to do with national issues, are yet determined on a basis of national party labels. For example, Republican county commissioners will probably be elected if the county gives a majority of its ballots to the Republican candidate for President. This does not mean that the Republicans will be better commissioners because they believe in a high protective tariff, but merely shows to what degree the party spirit has permeated American life. There is, to be sure, a new and refreshing tendency towards independence in politics, but the chances are still much against the independent candidate and in favor of the "regular" man.

The hold which national political parties have on the mass of voters has tended to the slow effacement of state and sectional lines, because it has emphasized national issues. It has thus helped the nation to overshadow the states. On the other hand, the party system has thrust great power into the hands of local "bosses," or managers—men who have been able to make themselves leaders in their party. Such men, by invoking party discipline, have often managed to elect inferior or even dishonest men to high office. For the sake of electing a President, men have often voted for all the candidates of a party, and thus have placed in power men less worthy than candidates of another party. The party system, as applied to local issues and offices, has been a fruitful source of misgovernment.

Machinery of Parties. If it is granted that the parties operate the government, then, it may be asked, who controls the parties? In the opinion of James Bryce, probably the best-known commentator on American institutions, control is divided among three groups: first, the individual leaders, who have risen through talents or ability to positions of influence; second, rich men, whose money donations enable them to share in the party's councils; third, the mass of citizens, who usually follow the lead of the two other groups, but occasionally revolt. When Bryce made this classification, three decades ago, there was more reason for it than there is to-day, for now the rich man, merely as such, is almost negligible as an influence in politics.

Permanent organization. The permanent organization of the great political parties is effected through committees. There are committees for every political unit, including the nation, state, county, township, city or town, and even the precinct. Each committee is independent in purely local matters, but for general party purposes is subordinated to the committee of the next larger unit. Thus, the county committee is subordinate to the state committee, which in turn is responsible to the national committee.

The primary purposes of such committees are legitimately to raise and spend money, to add to the strength of the party by getting recruits, to manage election campaigns, and generally to conduct all business pertaining to the party. The committees also determine the time and place at which some temporary organizations work in the interests of the party.

Temporary Organizations. These are the conventions and primaries. A convention is a meeting of delegates, who are chosen by districts for the purpose of nominating candidates for office and adopting a party platform. In fixing the methods by which members of such conventions are chosen and by which they are organized and do business, the various party committees have an important, and sometimes the sole, voice. A primary is nothing more or less than an election, within a party, of a candidate to oppose the candidate of some other party or parties. Theoretically, all members of a party are entitled to vote at a primary. In the rural districts this is a simple undertaking, for everybody is known to everybody else, but in the cities the party managers often keep lists of voters who are "regular" and are entitled to vote at party primaries. The primary is a recent addition to the American political system, and has already proved its worth, not merely in local elections, but also in Presidential contests. When a primary is a meeting of all the voters of a party in a district, it is called a *caucus.*

History of Political Parties in the United States. During the colonial period, political parties, as the term is now understood, did not exist. The issues which divided the people were centered about the relations of the colonies to the mother country, and upon these there was at first little difference of opinion. About the middle of the eighteenth century, however, after England began to develop a more rigid and harsher colonial policy, two factions arose in America. One, favored, or at least was willing to yield to, the attitude of the home government; the other declined to obey, and demanded a constantly increasing degree of self-government. About 1760 the latter began to call themselves *Whigs,* because of the gratitude which they felt towards the English Whigs; while the former were known as *Tories.* During the course of the Revolutionary War large numbers of the Tories left the country, returning either to England or crossing the border into Canada, where, as United Empire Loyalists, they had a conspicuous share in developing that great country.

Parties Under the Confederation. From the beginning of the Confederation there were differences of opinion about the new government. One faction, consisting chiefly of those who lived in rural districts, favored a loose confederacy, in which the individual state was to retain all the powers of sovereignty except the minimum required for the limited coöperation of all the states. Such an experiment in government was actually tried under the Articles of Confederation. Another faction, which steadily increased in influence as the weakness and inefficiency of the Confederation became apparent, demanded that the central government be granted all the essential powers of sovereignty and that there should be left to the states only the powers of local self-government. The latter faction, although not organized as a party, gained such strength that a convention was called to adopt a new Constitution.

Origin of Parties Under the Constitution. In the Constitutional Convention of 1787 in Philadelphia the two parties fought out their differences, with the result that the Constitution, though wholly satisfactory to neither faction, vested far greater powers in the central government than did the old Articles of Confederation. The first real party organization developed soon after the inauguration of Washington as President. Washington was elected not as the head of a party, but was the choice of the people as a whole. His Cabinet included men of both factions. Hamilton was the leader of the Nationalists, later called *Federalists;* Jefferson was spokesman for the *Anti-Federalists,* who were later known as Republicans, Democratic-Republicans and finally *Democrats.* For twelve years the Federalists were in power, and the Anti-Federalists had little to do but to criticize. During those twelve years, however, popular distrust of the Federalists became strong, partly owing to the frankly-expressed opinions of Hamilton and John Adams, who

praised the monarchical form of government, and partly because of the influence of the French Revolution. The result of this distrust was the defeat of the Federalists in 1800, and the seating of Thomas Jefferson in the President's chair in 1801.

Sixty Years of Democratic Supremacy. From 1801 to 1861 the Democratic party was the majority party. It lost, to be sure, three elections, those of 1824, 1840 and 1848, but these were all in the nature of political accidents. During this period the Democratic party underwent a double change. First, it disregarded its old principles, and for a time adopted the policy of liberal construction of the Constitution, but after slavery became the predominant political issue it again became the party of strict construction. Opposing the Democratic was the Federalist party, which was succeeded by the Whigs. When the Whig party split hopelessly in an attempt to hold Southern proslavery and Northern antislavery men together, its place was taken by the present-day Republican party. There were during this period a number of minor parties—the Anti-Masons; the Liberty party, led by James G. Birney; the Free-Soilers, an off-shoot of the Whigs; and the American, or "Know-Nothing," party. Each of these minor parties had a brief independent existence, although its principles may have survived in the two great parties.

Period of Republican Domination. In the critical year preceding the outbreak of the War of Secession, the Democratic party was split into Northern and Southern wings. The former, during the war, was allied with the Republicans in the so-called Union party. After the war, the Southern Democrats suffered from the errors of the Reconstruction period, and remained the minority party. With the exception of Grover Cleveland, no Democrat was elected President until 1912, forty-seven years after the surrender at Appomattox Court House. As in the half century preceding the War of Secession, there arose minor political parties, some of which threatened for a brief time to become major parties. These were the Liberal Republican; the Greenback, or National; the Prohibition; the Socialist, or Socialist Labor; the Populist; National Democratic, and Progressive parties. The noteworthy feature of these minor party movements is the fact that nearly all of them had their origin, or derived their greatest strength, in a discontent with social and economic conditions rather than with the purely political matters which had previously been considered by national parties. Almost all left an impress on politics. W.F.Z.

Political Parties in Canada

The Canadian system of party organization is modeled closely on that of the United Kingdom of Great Britain and Ireland. Canada has responsible government, which means that the executive and legislative branches of the government are properly coördinated. The contrary is true in the United States, where the President may be, and frequently is, of a different political faith from the prevailing majority in Congress. In Canada, therefore, both in Dominion and provincial politics, the control of the legislative branch is the object desired. The control of executive appointments, except in so far as these are determined by the Crown, is then in the hands of the legislative majority.

Both in the Dominion and provincial parliaments it is customary for each party to elect its leader. The leader of the majority party becomes Premier; the leader of the minority is recognized as the head of the opposition. The Cabinet becomes, in fact although not in name, a committee of the party in power for the purpose of carrying on the government. It is also, of course, a committee to govern the party. A similar concentration of authority exists in provincial affairs. For the most part there have been only two major parties in Canada, although from time to time a third or even a fourth party has been influential.

Origin and Development of Parties. Political parties in Canada were first formally organized after the War of 1812. In the decade following the war there arose in Upper Canada a sharp division between the ruling political class and a vigorous group of reformers. The latter were aroused by the pride and power, both socially and politically, of the small group of Tories who were known as the "Family Compact." The opposition demanded responsible government, substantially as it was known in England. Conspicuous among the reformers were William Lyon Mackenzie and Robert Baldwin. In Lower Canada too, there was a demand for greater popular rights. There the leader of agitation was Louis J. Papineau.

The Rebellion of 1837, although it resulted in the granting of specific reforms, did the general cause of reform considerable harm, for the

rebellion was an unreasonable outburst. More moderate Reformers, including Baldwin and Lafontaine, gradually drew away from the radicals, and by 1849 new party alignments were clear. The Baldwin Reformers were gradually absorbed by the Liberal-Conservative party, later known merely as the *Conservative* party, of which Sir John A. Macdonald was the leader. The Conservatives, on the other hand, also displaced or absorbed the reactionary Tories.

Between 1850 and 1867 there were two powerful minor parties, the "Clear Grits" in Upper Canada, and the Rouges ("Reds"), or Parti Rouge, in Lower Canada. These were both radical parties, and in a general way had similar aims. The Rouges, however, went farther than the Clear Grits in demanding the repeal of the Act of Union of 1841. Among the leaders of the Rouges were Papineau and A. A. Dorion. These minor parties disappeared from view with the coming of Confederation, and since 1867 there have been only the two great parties, the Conservative and the Liberal. There was also in Quebec the French Nationalist party, which was powerful in the province and exercised a considerable influence in Dominion affairs, but it did not attain the rank of a national political party. In matters of principles, broad distinctions between the Liberals and Conservatives are difficult to make, although the former are more inclined toward a support of provincial privileges and commercial reciprocity, while the latter advocated federalism and a preferential tariff for all parts of the British Empire. W.F.Z.

For further details, see CANADA, subtitle *History of Canada,* also subhead *History* under each of the provinces, and biographies of leading statesmen. Consult Macy's *Political Organization and Machinery;* Belloc's *The Party System* (English); Sloane's *Party Government in the United States of America.*

Related Subjects. The following articles in these volumes should be consulted in this connection:

Abolitionists
Anti-Federalists
Conservative
Constitutional Union Party
Democratic Party
Federalist Party
Free-Soil Party
Greenback Party
Know-Nothings
Liberal Republican Party
Liberal Party
Liberty Party
Loco-Foco
Nihilists and Nihilism
Populist Party
Progressive Party
Prohibition Party
Republican Party
Social Democrats
Socialism
Tory
Whig

Tomb, at Nashville, Tenn.

POLK, *pohk,* JAMES KNOX (1795-1849), an American statesman who was chosen to be the eleventh President of the United States. His administration is one of the most noteworthy in American history, because of the Texas and Oregon questions and their solutions. The Texas question developed the Mexican War and annexation of the state to the United States; the Oregon matter ended in addition of territory in a peaceful manner. Polk's attitude towards these questions was largely responsible for his nomination and election to the Presidency, and the solutions reached were largely his work.

As a man, Polk was a thinker and a student. He was tenacious of the opinions which he had formed, and was not easily moved by argument or public clamor. His private life was simple, and his home circle provided most of his amusements. George Dallas, Vice-President while Polk was President, described him as—

> Temperate, but not unsocial; industrious, but accessible; punctual, but patient; moral, without austerity; devotional, though not bigoted.

George Bancroft, a member of his Cabinet, wrote about Polk thirty-eight years after his death, as follows:

> Prudent, farsighted, bold, exceeding any Democrat of his day in his undeviatingly correct exposition of democratic principles; and in short, as I think, judging of him as I knew him, and judging of him by the results of his administration, one of the very foremost of our public men, and one of the very best, most honest and most successful Presidents the country ever had.

His Boyhood and Youth. James Knox Polk was born on November 2, 1795, in Mecklenburg County, North Carolina. The Polks, who originally spelled their name Pollock, were of Irish origin. Samuel Polk, in the fourth American generation of the family, was a North Carolina farmer of more than average intelligence. In 1806 he removed with his family to the fertile valley of the Duck River, a tributary of the Tennessee. There he made a new home in the section which was included a year later in the county of Maury, Tennessee. Samuel Polk, in addition to working on his farm, also worked from time to time as a surveyor. Of great assistance to him was his son James Knox, who was eleven years old when the family moved to Tennessee. Young James not only assisted in the management of the farm, but often accompanied his father on the latter's surveying trips.

James was a studious boy, went to school for several years, and from 1813 to 1815 was in charge of a private tutor. In the latter year he entered the sophomore class of the University of North Carolina. At the university he was no less studious and industrious than he had been at home. When he was graduated in 1818 he was without question the best scholar in his class in mathematics and the classics, and was chosen to deliver the Latin salutatory. It is interesting that his *alma mater,* many years later, when he was President of the United States, gave him the honorary degree of LL.D.

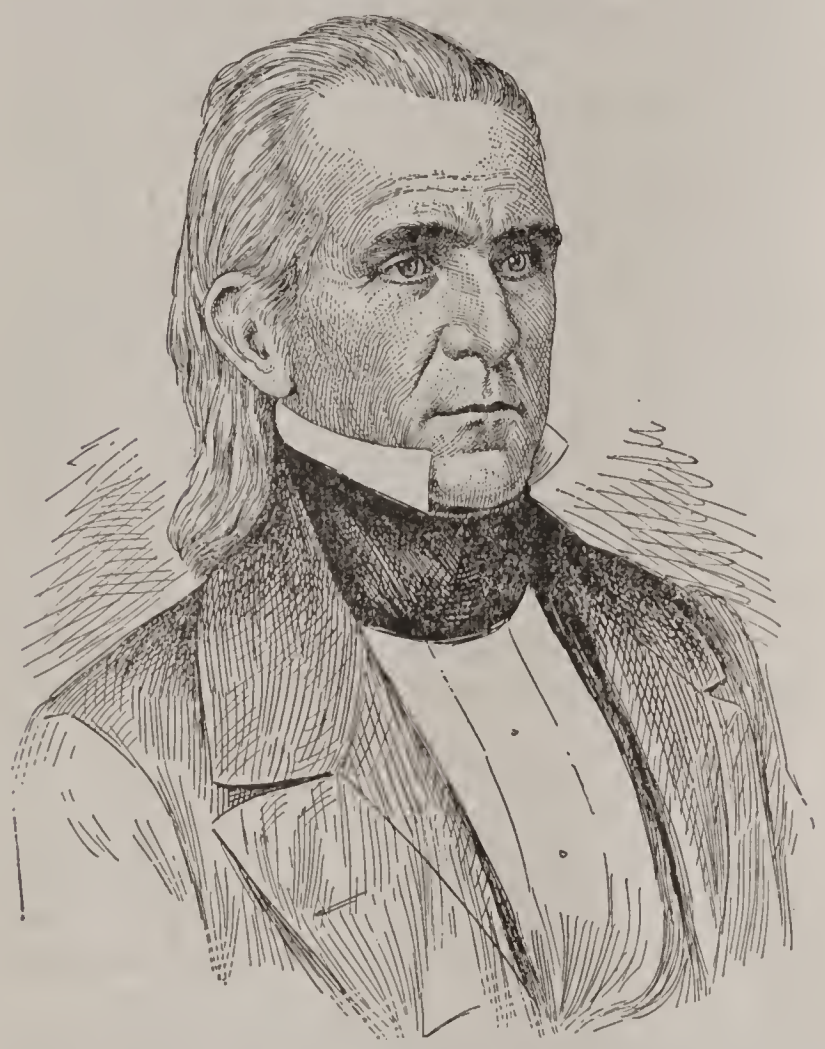
His Career as a Lawyer. In 1819 Polk entered the law office of Felix Grundy, then the foremost lawyer in Tennessee. After a year he was admitted to the bar, and at once established himself in independent practice at Columbia, the county seat of Maury County. His success was immediate, and with occasional breaks caused by his political activities, Polk continued to practice until his election in 1839 to the governorship of Tennessee. At one time his law partner was Gideon J. Pillow, later known as a Confederate general.

As a Lawmaker. Polk's high reputation at the bar was both a cause and a result of his activity in political affairs. He early began to expound the principles of the Democratic party, and soon won the nickname "Napoleon of the Stump." His speeches were argumentative rather than rhetorical—that is, they convinced his hearers by clear reasoning and simplicity of statement. After a brief service as chief clerk of the state house of representatives, Polk served a term in that body (1823-1825). There his reputation was further enhanced by his keenness in debate, his tact, and perhaps above all, his industry. One of the laws which he introduced and helped to pass prohibited the practice of dueling; unlike most of the prominent men of his day, he was never involved, either as principal or as second, in a duel.

When Polk first took his seat in the Federal House of Representatives in 1825, he was one of the youngest members of that body. After two years he was placed on the important Committee on Foreign Affairs, and shortly afterward was given a place on the Ways and Means Committee. As a member of the latter committee, he prepared, in 1833, a minority report unfavorable to the Bank of the United States, an action which led to much criticism from his constituents. During the long controversy over the Bank, and in fact during the whole of Jackson's two terms, Polk was one of the President's leading supporters. In 1835 the House elected him Speaker. He remained in this position until 1839, four years during which partisan feeling ran higher than it had ever run.

During Polk's first session as Speaker more appeals were taken from his parliamentary decisions than were ever known before, but his rulings were almost invariably sustained by the House. There is, too, the testimony of John Quincy Adams, who said that the Speaker, although opposed to the antislavery doctrines of Adams and his friends, extended to him "every kindness and courtesy imaginable."

Governor of Tennessee. In 1839 Polk refused renomination for Congress to become the Democratic candidate for governor of Tennessee. The Democratic party had recently been deserted by John Bell and other leaders, and the



JAMES KNOX POLK

election of the Democratic candidate seemed hopeless. Polk, however, was chosen by a majority of 2,500. His inaugural address included references to many national problems which were then disturbing the public mind. Polk believed that the Federal government had no right to tax the people, through customs duties or any other means, for a greater amount than was necessary to the maintenance of the government. He also remarked that the "agitation of the Abolitionists can by no possibility produce good to any portion of the Union, but must, if persisted in, lead to incalculable mischief." In 1841 and 1843 Polk was again a candidate for governor, but was defeated both times by James C. Jones, a Whig, and one of the most popular men in the state.

Presidential Candidate. Polk was the choice of Tennessee and several other states for the Democratic nomination for Vice-President in 1839. His failure to win this nomination and his defeats for governor in 1841 and 1843 do not seem to have lessened his influence in his party. Thus it happened that in 1844 it was again understood that he was a candidate for Vice-President. The national convention, unable to unite on Van Buren or any of the men, including Lewis Cass and James Buchanan, who opposed him, finally compromised on Polk for President. His platform was carefully stated by him in a letter to a committee which supported him for Vice-President:

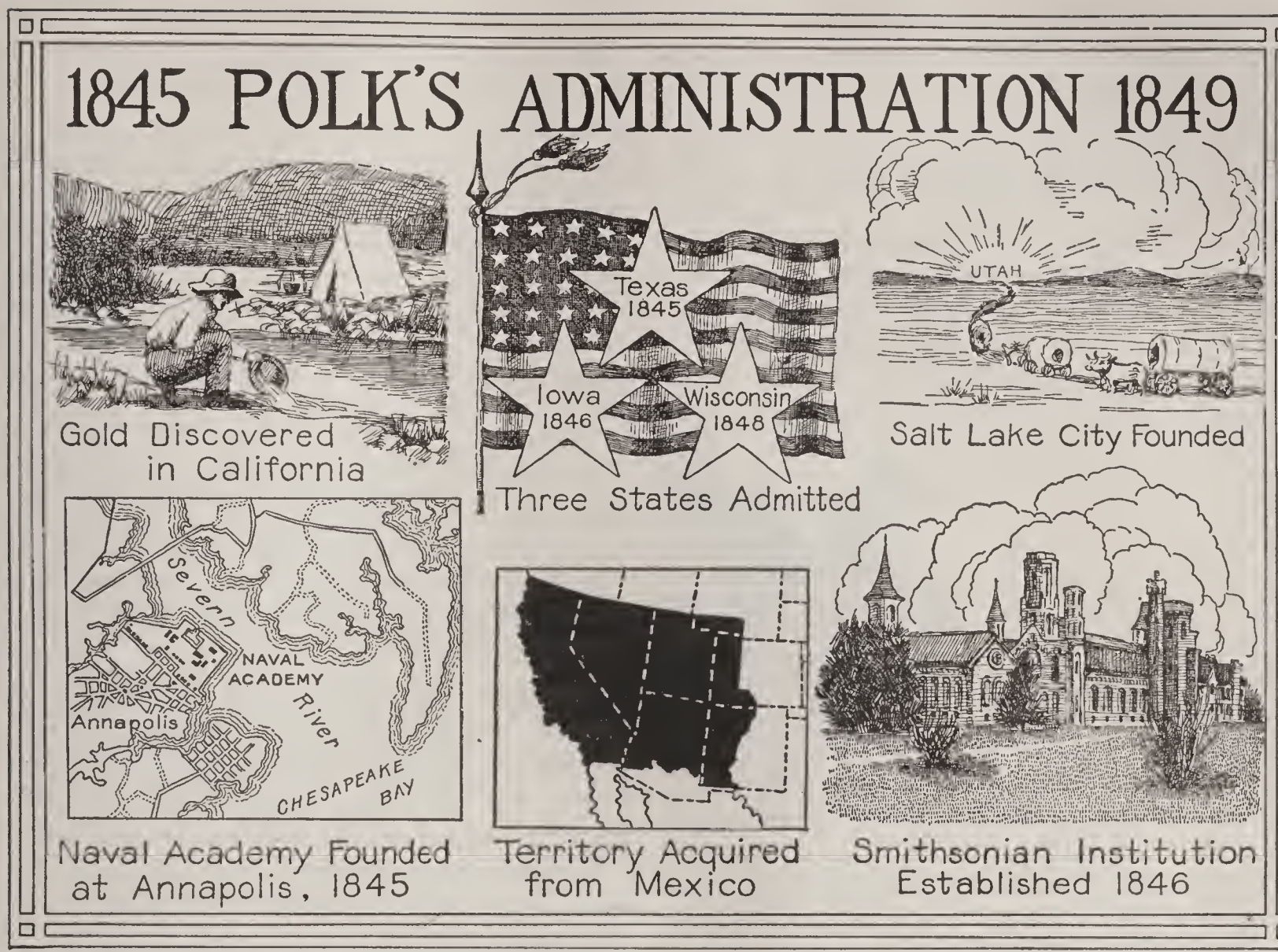
> I am in favor of the immediate reannexation of Texas to the government and territory of the United States. The proof is fair and satisfactory to my own mind that Texas once constituted a part of the territory of the United States, the title to which I regard to have been as indisputable as that to any portion of our territory.

The "reannexation" of Texas was coupled with the "reoccupation" of Oregon, and these made the principal issues of the campaign. The popular slogan was "Fifty-four forty or fight," in reference to the northern boundary of Oregon, but more votes were decided by Polk's clear-cut position in regard to Texas. The position of Henry Clay on the Texas question aroused the suspicion of many Northerners, and had it not been for the Whig votes in New York which went to James G. Birney, the anti-slavery candidate, Clay would probably have been elected. The contest was close and exciting; Clay received 105 electoral votes, Polk 175. Polk's majority of the popular vote of the nation was only 40,000.

The Administration of James K. Polk, 1845-1849

Polk selected a Cabinet which made a favorable impression on the country. James Buchanan was Secretary of State; the others were Robert J. Walker, an ex-Senator and an authority on national finance, Secretary of the Treasury; William L. Marcy, ex-governor of New York, Secretary of War; George Bancroft, the historian, Secretary of the Navy; Cave Johnson, of Tennessee, Postmaster-General; John Y. Mason, who had been Secretary of War in Tyler's Cabinet, Attorney-General. Bancroft resigned after a year, his place being taken by Mason, who was in turn succeeded by Nathan Clifford, of Maine. With this exception the Cabinet remained unchanged throughout the four years, thus nearly equaling the record made by President Pierce's Cabinet.

The War with Mexico. The outstanding feature of Polk's administration was the Mexican War (which see). In his first annual message to Congress, the President declared that the annexation of Texas was a matter that con-



cerned only the latter and the United States, no foreign country having any right to interfere. He also informed Congress that the American army under General Zachary Taylor had occupied the west bank of the Nueces River, beyond which Texas had never attempted to exercise jurisdiction. On December 29, 1845, Texas was admitted to the Union. The Mexican authorities, however, used every ingenuity to negotiate with the United States concerning the disputed territory east of the Rio Grande, but the negotiations came to naught. Thereupon General Taylor's force advanced, and met the Mexican army at Palo Alto.

President Polk, after the Battle of Palo Alto, asked Congress to declare war. The declaration met considerable opposition from the Whigs, especially as it stated that a state of war existed "by the act of the republic of Mexico." Abraham Lincoln, then a member of the House of Representatives, introduced the so-called "spot resolutions," calling on the President to name the spot of American territory which had been outraged by the Mexicans and might therefore be assigned as a reason for war. The justification for President Polk's order to the army to invade the disputed territory is perhaps doubtful, and has sometimes been questioned by impartial historians. It must be remembered, however, that Polk himself believed the cession of Texas to Spain in 1819 was a mistake which should be rectified by reannexation. His party's platform demanded "reannexation," and the war became a mere detail in securing this end. Polk believed that the Mexican authorities could not be trusted, and that they could only be persuaded by force. However that may be, the war undoubtedly had the approval of the majority of the American people, particularly after the armies of Taylor and Scott had won a few victories.

The Wilmot Proviso. A political incident of the war period was the attempt to pass the Wilmot Proviso (which see). Wilmot attempted to secure the prohibition of slavery in any territory which might be acquired from Mexico. The proviso passed the House, but failed in the Senate. The result of the contest over this principle soon resulted in the origin of the doctrine of "popular sovereignty," by which the Democrats attempted to reconcile the Northern and Southern members of the party. The principle of the Wilmot Proviso was finally adopted in 1862, when Congress forbade slavery in "any of the territories of the United States now existing, or which may at any time hereafter be acquired."

The Oregon Question. While the United States was at war with Mexico, there was also great danger of war with Great Britain. The United States claimed that the line of 54° 40′ N. latitude was the northern boundary of the territory acquired from France and Spain, whereas Great Britain insisted that the Columbia River was the boundary. The Democratic platform demanded the whole of Oregon, up to 54° 40′, "with or without war with England," and "fifty-four forty or fight" was the great

ELECTION MAP, 1844

States colored black gave their electoral votes to Polk (Democrat); states barred diagonally voted for Clay (Whig). White area represents unorganized territory.

rallying cry of the campaign. After many negotiations, however, the Senate, on June 15, 1846, accepted the compromise offered by Great Britain, to fix the boundary at the 49th parallel. As President Polk had endorsed the platform's demand for 54° 40′, he threw upon the Senate the entire responsibility for accepting the compromise treaty, but he realized without a doubt that compromise and not war was necessary.

President Polk's policy toward the Mexican problem and his open disapproval of the Abolitionists were often interpreted to mean that he was a proslavery man. On the contrary, he was not a slavery propagandist, and in the settlement of the Oregon question he did everything in his power to secure the exclusion of slavery from that territory. In his message approving the bill to establish Oregon as a territory, Polk explained his attitude toward slavery in these words:

> I have an abiding confidence that the sober reflection and sound patriotism of all the states will bring them to the conclusion that the dictate of wisdom is to follow the example of those who have gone before us, and settle this dangerous question on the Missouri Compromise or some other equitable compromise which would respect the rights of all, and prove satisfactory to the different portions of the Union.

The Tariff of 1846. The tariff was another leading issue in the campaign of 1844. Polk was pledged to a tariff for revenue only. In accordance with his views a bill was presented to Congress, and was passed after an unusually keen discussion, during which partisanship ran high. In the Senate the bill was saved from defeat by the vote of Vice-President Dallas, who broke a tie by voting for it. The unusual character of the preceding discussion is indicated by his explanation of his vote, as follows:

> If by thus acting it be my misfortune to offend any portion of those who honored me with their suffrages, I have only to say to them, and to my whole country, that I prefer the deepest obscurity of private life, with an unwounded conscience, to the glare of official eminence spotted by a sense of moral delinquency.

President Polk, arguing more concretely, explained his views by saying that all classes—the farmer, the manufacturer, the man of commerce, the navigator, or the mechanic—"are equally entitled to the nation's protection."

Internal Improvements. On the tariff, the President's views coincided with those of the majority in Congress, but on the question of internal improvements they differed. A large majority in both houses favored a liberal use of the nation's funds for such improvements. In vetoing a rivers-and-harbors bill in 1846 Polk submitted a message of unusual interest, in which he called attention to the harmfulness of a system which allowed the nation's money to be spent in particular sections, leaving other parts of the country without financial assistance from the government. In 1847 Congress again voted large sums for internal improvements, but Polk again vetoed the bill.

Reëstablishment of the Independent Treasury. Worthy of special mention is the Act of August 6, 1846, reëstablishing the independent treasury system. In principle, under this act, the government "pays cash, demands cash, and keeps its funds in a strong box," but in actual practice there have been wide variations from principle. The purpose of the act was to free the treasury from interference by the banks.

Other Noteworthy Events. One of the results which followed the introduction of the Wilmot Proviso was the development of the doctrine of popular sovereignty. Offsetting this movement was the formation of the Free-Soil Party (which see). Three states were admitted to the Union during Polk's administration; these were Texas in 1845, Iowa in 1846, and

OUTLINE AND QUESTIONS ON JAMES K. POLK

Outline

I. Early Years

(1) Birth and family
(2) Education
  (a) With private tutor
  (b) At University of North Carolina
  (c) Law study
(3) Career as a lawyer

II. Early Political Activity

(1) "Napoleon of the Stump"
(2) In state house of representatives
  (a) Opposition to dueling
(3) In Federal House
  (a) Work on committees
  (b) Elected Speaker
(4) As governor of Tennessee
(5) Candidate for Presidency
  (a) His platform
    1. "Reannexation" of Texas
    2. "Fifty-four forty or fight"
  (b) Outcome of election

III. Administration

(1) His Cabinet
(2) War with Mexico
  (a) Causes
  (b) Events
  (c) Outcome
(3) The Oregon trouble
  (a) United States claimed 54° 40′ as northern boundary
  (b) The compromise
  (c) Exclusion of slavery from territory
(4) Domestic affairs
  (a) Tariff of 1846
  (b) Wilmot Proviso
    1. Failure to pass Senate
    2. Growth of "popular sovereignty" idea
  (c) Internal improvements
    1. President's veto of bills
  (d) Reëstablishment of independent treasury
  (e) Formation of Free-Soil Party
  (f) Admission of states
  (g) Organization of territories
  (h) Discoveries and inventions
    1. Ether
    2. Sewing machine
    3. Cylinder printing press
  (i) Founding of United States Naval Academy
  (j) Founding of Smithsonian Institution
  (k) Election of 1848

Questions

When was "fifty-four forty or fight" a popular slogan, and what did it mean? How did the United States finally compromise on its attitude toward this question, and what was the President's view of the compromise?

Who said "I prefer the deepest obscurity of private life, with an unwounded conscience, to the glare of official eminence spotted by a sense of moral delinquency," and under what circumstances did he say it?

What two questions made Polk's administration one of the most important in the history of the country?

Of what state was Polk a native? Was any other President born in the same state?

When was Polk called the "Napoleon of the Stump," and what do you understand by the nickname?

What was his attitude toward the Abolitionists? Toward slavery?

How did Polk justify his use of the word "reannexation," rather than "annexation," in speaking of Texas?

What were the "spot resolutions," and by whom were they introduced?

Why did Polk persistently veto bills for various internal improvements?

What was the doctrine of "popular sovereignty," and how did it grow out of the Wilmot Proviso?

Wisconsin in 1848. Oregon was organized as a territory in 1848, and in 1849 California, though not then admitted to the Union, organized its own government. Gold was discovered in California in the preceding year, and the quest for gold drew thousands to the newly-opened regions. The year 1849 also saw the founding of Salt Lake City by the Mormons. In 1846 Elias Howe received his patent on the sewing machine, which he had perfected in the preceding year, and in 1847 the Hoe cylinder printing press was invented. Ether was first used as an anesthetic in surgery in 1846. During Polk's term were founded two institutions, now of national importance—the United States Naval Academy at Annapolis in 1845, and the Smithsonian Institution at Washington, in 1846. The year 1846 was also memorable for the terrible famine in Ireland, as a result of which the first great Irish immigration to the United States began.

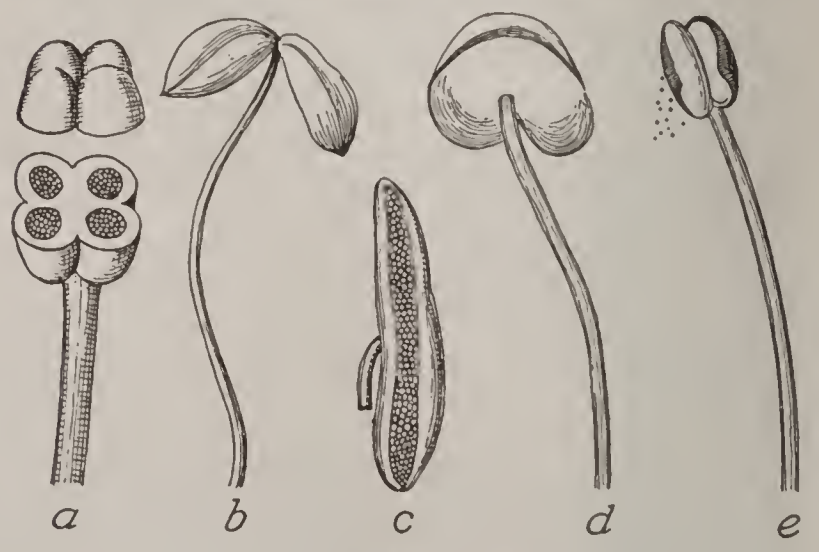
Election of 1848. In accepting the nomination for President in 1844 Polk declared that he would discharge the duties of the office "with the settled purpose of not being a candidate for reëlection." To this purpose he adhered. The Democrats then nominated Lewis Cass of Michigan. The Whigs chose General Zachary Taylor, and the newly-organized Free-Soilers nominated Martin Van Buren. Taylor was elected (see TAYLOR, ZACHARY).

At the close of his term Polk retired to Nashville. There he died on June 15, 1849. In his will, he left his estate "to the worthiest of the name forever," but the courts in 1891 decided that it was void because it directed a perpetuity. Mrs. Polk (Sarah Childress, 1803-1891), lived on the estate until her death. The remains of the President and his wife were interred within sight of the old homestead, but were removed by the state of Tennessee in 1893 and reinterred on September 19, 1893, on Capitol Hill, Nashville. The homestead was long ago torn down, and a part of the site is occupied by the Carnegie Public Library. W.F.Z.

Consult Dallas' *Eulogy on the Life and Character of the Late James K. Polk; Diary of James K. Polk during his Presidency;* also standard histories of the United States.

POLK, LEONIDAS (1806-1864), an American soldier, bishop of the Protestant Episcopal Church and Confederate general during the War of Secession. He was born in Raleigh, N. C., and was educated at the University of North Carolina and at West Point, where he was graduated in 1827. He resigned from the army, entered the ministry and became the first Protestant Episcopal bishop of Louisiana. While serving in this capacity he was instrumental in establishing Sewanee University in 1858. After the outbreak of the War of Secession, Bishop Polk tendered his services to the Confederate government and was appointed major-general by Jefferson Davis, with command of the defense of Missouri and Tennessee. As lieutenant-general he fought at Stone River, Belmont, Shiloh, Perryville and Murfreesboro, and led a corps at Chickamauga. He was temporarily suspended for disobedience to orders in this last battle, but was exonerated by President Davis. During the early part of 1864, he had charge of the Department of the Mississippi and was with Johnston in Sherman's Atlanta campaign. He was killed by a cannon shot on the Marietta (Ga.) battlefield.

POLLEN, *pol'en,* **AND POLLINATION,** *pol i na'shun.* The tiny, golden grains of pollen formed on the anther of a flower, when carried to the stigma, or seed-bearing part, by insects, wind or other agencies, fertilize the ovule which



POLLINATION

(*a*) Stamen of moonseed, with anther cut across; (*b*) stamen showing two anther cells diverging; (*c*) stamen of globe amaranth, open from top to bottom, showing pollen; (*d*) stamen of mallow; (*e*) stamen showing split down between the two cells and means by which pollen escapes.

forms the seed. The grains are minute cells of various forms, smooth or covered with spines or knobs, but always the same in the same plant. They consist of three layers; the inner one is a sticky substance and contains the fertilizing cells. After the pollen grain is lodged on the stigma, this inner layer protrudes in a long, delicate tube which makes its way through the style to the ovule. As soon as it is reached, the ovule divides and forms an embryo which ripens into a seed.

Pollination is merely the transfer of the pollen to the stigma. *Self-pollinated* flowers are those in which this transfer is performed by

the plant itself, and *cross-pollinated* flowers are those which must depend upon other agents to carry the pollen of one flower to the stigma of another. Usually inconspicuous and odorless flowers and those whose stigmas, before withering, curve so as to come into contact with the anthers, are self-pollinated.

Insects as Pollen Carriers. When flowers are not capable of self-pollination they are equipped with various aids to assist in cross-pollination. In some, the showy blossom, in others, the fragrant scent, in still others the sweet nectar, attracts insects to the flower.

The most important carriers of pollen are the honey-bees, which flit from flower to flower to sip the nectar, which they convert into honey. As they wallow in the pollen they rub the grains on their hairy bodies. They are provided with two tiny cups on the hind legs for the carrying of pollen to their nests, but that which is scattered over their bodies is shaken off on the flowers they afterwards visit. Usually the flowers whose color attracts bees are red, blue or pink; in yellow and white blossoms it is the nectar that attracts the insects. The importance of these insects to plant life is shown by the fact that when some vegetables are grown under glass, it is necessary to keep a swarm of bees in the hothouse to insure pollination of the flowers and consequently another crop.

Ants, beetles, moths and butterflies are other pollen carriers. Some flowers are adapted to pollination by certain insects. Those which give off their fragrance at night, such as some varieties of honeysuckles and petunias, are pollinated by night moths, and those which are most fragrant in the sunlight attract day-flying bees and butterflies. Other flowers, such as the violet, in which the nectar is deeply hidden in the corolla, cannot be pollinated by small insects, although the pollen grains can easily be reached by the tongues of bees. In the snapdragon, the little trapdoor concealing the pollen can be pushed open only by large insects.

TYPES OF POLLEN GRAINS

(*a*) Dandelion; (*b*) hemp; (*c*) gentian; (*d*) squash.

An interesting example of the dependence of a flower upon one particular kind of insect is seen in the fig, which cannot produce seed that will grow unless pollinated by a small wasp. The bloom of the yucca tree is self-pollinated only by the yucca moth, which lives in the flower.

Wind and Other Agents. The wind scatters the light, dry pollen of many flowers and weeds, and the humming bird carries that of the wild balsam, trumpet creeper, gladiolas and similar flowers. Many of Luther Burbank's efforts in producing new varieties of plants are the result of artificial cross-pollination. E.B.P.

Related Subjects. The reader is referred to the following articles in these volumes:

Bee, subtitle *The Honeybee*
Burbank, Luther
Cross-Fertilization
Flowers, subhead *Flower Structure*
Germination
Seeds, subtitle *Seed Dispersal*

POLL, *pohl,* **TAX.** The term is derived from the English *poll,* which means *head;* it is sometimes called *capitation* tax, from a Latin word meaning *head.* A poll tax is therefore a uniform tax levied upon individuals without reference to their property, business or employment. There have been instances where a poll tax has been levied upon persons in which the amount assessed depended upon the wealth of the individual, but in the United States especially such a tax is illegal, the Constitution declaring that all such direct taxes levied by Congress must be on the basis of population, meaning on each person, and not based upon wealth. The first income tax bill of the United States was essentially a poll tax, but was declared unconstitutional because there was not a uniform levy against all people.

The United States Congress has never exercised its right to levy a poll tax, but many states of the American Union provide this as one of the means of raising revenue, and in some of them the right to vote depends on the payment of a poll tax. On the other hand, it is within the province of a state to declare against the poll tax, and a few have done so on the ground that it is harsh and oppressive. It is certainly an unpopular tax, since the people naturally feel that government revenue should be levied on property. Wherever poll taxes are levied the money derived is placed with the general revenues of the taxing body, and is not set aside for special purposes.

In English history a poll tax has been imposed on several occasions, the last being in 1698. Three hundred years earlier a levy of this nature was the occasion of the brief rebellion of Wat Tyler.

PO'LO, a ball game played on a grass-covered field by men on horseback. In its rules it is very much like hockey (which see). Two opposing teams, usually of four men each, endeavor to drive the ball through their opponents' goal posts. A regulation field is 900 feet long and 450 feet wide; the posts, which are made of light wood or papier mâché, so that they will break easily in case of collision, are placed twenty-four feet apart, at opposite ends of the field. The players use white wooden balls three and one-fourth inches in diameter, and cane or rattan mallets from fifty to fifty-six inches in length. At one end of the mallet is a cigar-shaped piece of hard wood; a lightweight leather strap at the other end goes about the wrist.

In starting the game the men of each team are stationed so as to defend their respective goals, the first two men playing forward, the third half back, and the fourth full back. The game is divided into eight periods of seven and one-half minutes each, three-minute intervals between periods being allowed for changing ponies. At the end of the fourth period a rest of seven minutes is allowed. As polo is a fast and exciting game, the ponies are driven very hard, and can play but a short time without resting. The expense of training and keeping these animals makes the game a rich man's pastime.

In England and its colonies polo has long been a high favorite among sports, and since 1876, when James Gordon Bennett introduced it into the United States, it has been steadily growing in favor with Americans. A series of matches between representative English and American teams for the American International Challenge Cup has been attracting much interest of late years. The first match, won by England, was played at Newport in 1886. The American "Meadow Brook Four" won the cup in 1909, after the English had held it for twenty-three years, and were victorious again in 1911 and 1913. In 1914, however, an English team regained the cup by winning two straight matches.

Water Polo is a similar game played by swimmers, who use an air-filled ball that will float in water.

Consult Miller's *Modern Polo;* Drybrough's *Polo.*

POLO, MARCO (about 1250-1324), a medieval traveler who lived in Venice, and whose journeys in the East made him famous. He was the son of Nicolo and the nephew of Maffeo Polo, whose trade ventures led them into long journeys in the Orient. On one of these journeys they reached Cathay (China) and were cordially received at the court of the celebrated Kublai Khan. Returning to Venice in 1269, they set out again for Cathay two years later, and this time took the young Marco with them. The Mongol ruler received them with even greater marks of favor, and appointed Marco to various offices of importance, which made it possible for him to become acquainted with different parts of the realm. Indeed, so greatly did Kublai appreciate the society of the Europeans that he was loath to allow them to depart, and only with great reluctance gave his consent to their accompanying an embassy to Persia, which set out in 1292.

In 1295 the Polos reached Venice again, and in the next year Marco took part in a war between his native city and Genoa, in the course of which he was taken prisoner. During his confinement he dictated in French to a fellow-prisoner the story of his travels, which was published as the *Book of Marco Polo.* This created a wide sensation, and for centuries was the source of European knowledge about the Orient. Most of its statements were looked upon as fiction or exaggeration, but later explorations showed Marco Polo to have possessed keenness of observation and an accurate memory.

Consult Yule's *The Book of Sir Marco Polo.*

POLYBIUS, *po lib'i us* (about 204-122 B. C.), an eminent Greek historian. While still a young man he held important political positions in his native city of Megalopolis, in Arcadia, but after the conquest of Macedonia in 168 B. C. he was taken with other noble young men to Rome as a hostage. There he became intimately acquainted with Scipio Africanus the Younger, and accompanied him on his expeditions to Spain and Africa. Later he rendered valuable service to his native country by helping to procure favorable terms in a treaty between Rome and Greece. He is, however, chiefly noted for his *Histories;* of his forty books but five have come down to us. The history as a whole treated of the growth of the Roman empire from 266 to 146 B. C. Polybius was the first historian to try to trace the causes of events.

POLYCRATES, *po lik'ra teez,* a tyrant of Samos, who lived in the sixth century B. C. He made himself ruler of Samos in 535 B. C., compelled other islands to pay tribute to him and conquered some of the provinces of Asia

Minor. For a time his good fortune was so uninterrupted that he was called the "darling of the gods," but his exceeding prosperity helped to bring about his downfall. Herodotus tells that the Egyptian king Amasis, a strong ally of Polycrates, became alarmed lest the gods, in jealousy, should turn against the Samian despot; and he implored Polycrates to sacrifice to them some possession which he valued highly. Accordingly, Polycrates threw into the sea a ring of great worth, which the next day was found in the belly of a fish that had been presented to him. Looking upon this as a sign that the gods would not accept the sacrifice, Amasis broke the alliance. About 522 B.C. a Persian ruler of Sardis invited Polycrates to visit him, and on his arrival had him put to death.

POLYGAMY, *po lig'a mi,* a system of marriage by which a man has more than one wife at one time. The word, commonly used in this sense, is from two Greek words meaning *many marriages,* and in its widest sense includes *polyandry* also, which is the term for *many husbands;* but polygamy is the more accurate term used to denote a plurality of wives. From earliest times to the present the taking of more than one wife has been common among various races, though never in the world's history has it been the only form of the marriage relation. It was not forbidden among the ancient Greeks, but was very seldom practiced, and it gained almost no hold among the Romans. The Britons practiced it, but it was very rare among the early Germans, a fact which the Roman historian Tacitus finds worthy of note.

In Oriental countries polygamy is often permitted, and sometimes enjoined, by the religion of the state. Mohammedans may have four wives, but among them, as among other peoples who approve of polygamy, the custom really obtains only among the wealthy classes, for the poor man cannot support more than one wife, even in the primitive style in which he lives. Among the Hindus there are no restrictions as to number, and a harem of one hundred wives is by no means unknown. Chinese law permits of but one wife.

The ancient Jewish law permitted polygamy, though it was not generally practiced, and the Bible contains no injunction against it. Christianity, however, has always strongly opposed it, and laws against it exist in all Christian countries. In the United States the Mormons, enjoined thereto by their religion, practiced polygamy openly until 1890, when Congress passed laws absolutely forbidding plural marriages.

E.D.F.

POLYGON, *pol'i gon.* A plane figure bounded by three or more straight lines is called a *polygon.* The bounding lines are called the *sides;* the sum of the sides is the *perimeter.* The angles formed by the sides are the *angles* of the polygon, and the meeting points of the sides are the *vertices* of the polygon. A polygon is a triangle, quadrilateral, pentagon, hexagon, heptagon, octagon, etc., according as the sides number three, four, five, six, seven, eight, etc. If all the sides are equal, the polygon is *equilateral.* If all the interior angles are equal, the polygon is *equiangular.*

The angles inside the perimeter are called the *interior* angles. If the sides are extended they form other angles lying outside the polygon, which are called the *exterior* angles.

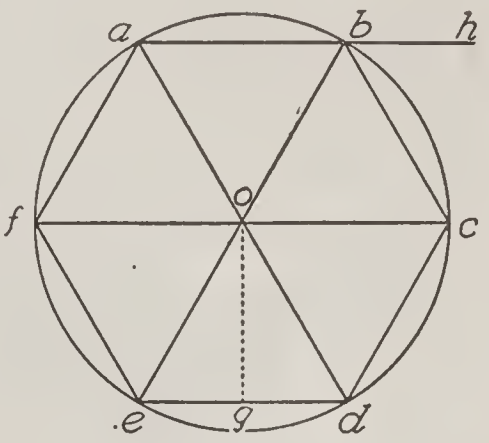


FIG. 1

In Fig. 1 the angle *a b c* is an interior angle; the angle *h b c* is an exterior angle.

The sum of the interior angles of a triangle is 180°, or two right angles. The sum of the interior angles of a quadrilateral is 360° or four right angles. *The sum of the interior angles of any polygon is the number of sides minus 2, times two right angles.* This can be seen by dividing any polygon into triangles, as in Fig. 1. There are as many triangles as sides of the polygon; the sum of the angles of each triangle is two right angles. The sum of the angles at the center is four right angles. So the sum of the interior angles of the polygon equals six times two right angles, minus the four right angles at the center, or sum of interior angles: this may be stated—6×2 right angles—2×2 right angles, or (6—2)×2 right angles.

Let n stand for the number of sides of any polygon and s for the number of degrees in the sum of its interior angles, and we have:

$$s = (n-2) \times 2 \text{ rt. angles}$$

or

$$s = (n-2) \times 180°$$

The sum of the exterior angles of a polygon, taking one at each vertex, is four right angles, or 360°.

It is seen in Fig. 1 that the sum of the exterior angle at b and the interior angle at b is 180°. Then the sum of the exterior and interior angles at all the vertices is n, the number of vertices, times 180°. But we know that the interior angles equal $(n-2)\times 180°$, and we see that the sum of the exterior angles equals $n\times 180°-(n-2)\times 180°$, or $(n-n+2)\times 180°$, or $2\times 180°$, or 360°, or four right angles.

A regular polygon may be divided into equal triangles. The area of each triangle is the product of its base and half its altitude. In Fig. 1, the area of triangle $c\ o\ d$ equals $\frac{e\,d\times o\,g}{2}$.

The area of the polygon is equal to the number of sides times the area of each triangle. Let n be number of sides of a regular polygon, 1 equal length of each side, and a be the perpendicular distance from the center to each base; then area of polygon $=n\times 1\times\frac{a}{2}$, or area of polygon $=$ perimeter $\times\frac{a}{2}$. A.H.

POLYNESIA, *pol i nc' shi a,* a term applied collectively by modern geographers to a group of Pacific islands lying east of the 180th meridian. Polynesia is one of the four divisions of the geographic section of the globe known as Oceania. It includes the Samoan (or Navigator), Tonga (or Friendly), Phoenix, Cook, Society, Marquesas and the Hawaiian islands and a few less important groups. See colored map, with article OCEANIA, for detailed outline of these ocean groups.

POLYP, *pol' ip,* a tiny water animal generally found growing in large colonies attached to stones or bits of wood lying on the bottom of streams or in the sea. It is very simple in structure, being a trifle more complex than the

POLYPS

sponge; it has little, waving tentacles which reach out to gather its food, while small cells within the body digest it. The colonies of polyps increase in size very rapidly, for the young shoot out as buds from the parent and remain attached, so that in time the group looks like a tree. Most of these animals produce bell-shaped structures called *medusae,* which are soft, gelatinlike bodies that soon separate from the polyps and swim around in the water, being then known as jellyfish. One important member of the family, the *hydra,* does not live in colonies, but is found in freshwater streams and pools attached to a stone or weed. It is very small and looks like a tiny white or green spot, but it can move from place to place, feeding itself upon very small water life (see HYDRA, FRESH-WATER). Coral, another form of polyp, is described on page 1576.

POLYPHEMUS, *pol i fe' mus,* in the Greek myth, a son of Neptune, a Cyclops, who lived with the other Cyclopes on the island of Sicily. All day he wandered about with his flocks, which at night he drove into a huge cave where he lived alone. Ulysses and his companions were cast ashore on the island during their voyaging, and were captured by the giant and shut up in his cave to be devoured. Four were eaten, and then Ulysses with his remaining comrades, having made the giant drunk, blinded him by plunging a heated stick into his one great eye. Roaring with pain, Polyphemus called the other Cyclopes, who asked who was making him suffer. "No Man is hurting me," cried Polyphemus. Now the Cyclopes could not know that No Man was the name by which Ulysses had called himself, so they refused their help, declaring that the pain must be from the gods, in punishment for sin. Mad with rage and pain, Polyphemus stationed himself at the entrance of the cave that no one might escape, but Ulysses and his companions, by tying sheep together in threes and concealing themselves beneath them, passed out in safety.

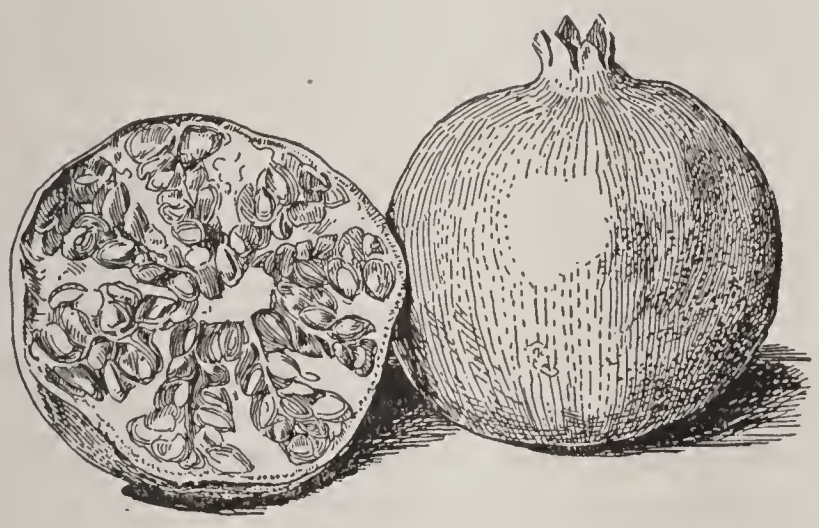
POLYTECHNIC, SCHOOLS. *pol i tek' nik,* See SCHOOL, subhead *Technical Schools*; MANUAL TRAINING.

POLYTHEISM, *pol' i the iz' m,* a Greek word meaning *belonging to many gods,* is the distribution of a faith and worship among several gods, as opposed to *monotheism,* which is the belief in and worship of one God. The general supposition is that monotheism is the original form of worship and that polytheism and other forms of belief sprang from those who abandoned the first principles. The feeling of dependence and the inclination to worship are natural to man, hence people living under primitive conditions are easily induced to worship familiar objects or forces that inspire ad-

miration or awe. The primitive man's conception of nature held that all things, animate and inanimate, possessed sensibilities and passions like his own, with the power to help or hurt him; consequently he would fear, flatter or venerate them.

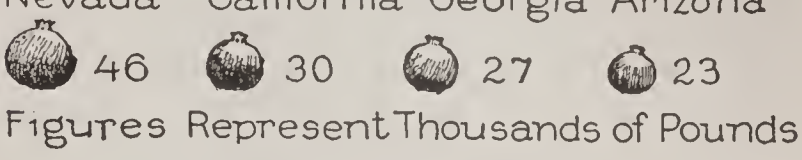
At first polytheism consisted in the worship of the elements, of the stars and of fire. Later it took special form from the traditions and relative civilization of each nationality. Among the savages it sank to fetishism (see FETISH). The sea, the sun, the moon, rivers, plants and stones were worshiped, and it is but a step from the lowest fetishism of the savage to the polytheism of the more cultured people of antiquity, in which the same objects become their gods, for example, Jupiter, Neptune and Apollo. In the early days of polytheism the gods were frequently interchanged, and when the believer vainly sought aid from one, he might turn to another for protection. Accordingly, in some countries the gods were classified in groups to satisfy the various necessities and castes.

POMEGRANATE, *pom gran'ate,* the fruit of a tree widely cultivated in the tropics and subtropical regions, and found wild in Western Asia and Northwestern India. As the pomegranate is sensitive to low temperatures, it is grown in the United States only in the southern part of the country. Under cultivation it grows from fifteen to twenty-five feet high and bears numerous slender branches, at the ends of which appear the large, scarlet flowers. The fruit, which has a hard rind and looks something like an orange, is of a deep golden color,



POMEGRANATE
Showing cross section.

shaded with red. It is filled with numerous purple and red seeds, each enclosed in a layer of pulp having a pleasant, refreshing taste. The pulp is used to make cooling drinks; in Mexico an ardent spirit is distilled from it, and in Persia it is made into wine. The rind contains a large amount of tannin, which is employed as an astringent medicine and is valued in the tanning of leather. The pomegranate was familiar to the Hebrews in Bible times; a picture of the fruit appeared on the pillars of Solomon's Temple. In classic mythology Proserpina (which see) was forced to spend six



THE AMERICAN CROP
The figures represent the average number of pounds yearly for a period of five years.

months of each year in Hades because she had eaten six seeds of the pomegranate while living with Pluto.

POMERANIA, *pom e ra'ni a,* a Prussian province in the northern part of Germany, lying along the Baltic Sea. It has an area of 11,629 square miles and a population (1919) of 1,787,193. The chief river is the Oder, on the

LOCATION OF POMERANIA

banks of which is situated the city of Stettin, the capital and commercial center of the province (see STETTIN). There are numerous harbors along the Baltic, and many lakes are found in this region. Pomerania is for the most part a flat farming country, which produces good crops of rye, oats, wheat, barley, potatoes, beets and tobacco. The smoked fish of the province is famous. Shipbuilding, glass-making, sugar refining, brewing, distilling and the manufacture of tobacco products, woolen goods and machinery are the chief industries of the towns. Politically the province is divided into three districts—Stettin, Köslin and Stralsund.

POMONA, *po mo'na,* the Roman goddess of fruits and flowers. Of several legends associated with her name, the most interesting is the story of the courtship of Vertumnus. When she had long refused to listen to his pleadings,

he disguised himself as an old woman, came into her garden and began to converse with her about love. Pomona finally admitted that only one of her suitors, Vertumnus, was worthy of her. Upon hearing this confession, her lover revealed himself in his true form and clasped her in his arms. She then consented to marry him, and thereafter he labored with her.

POMONA, CAL., named for the goddess of fruits, is in one of the most productive orange-growing communities in the United States. It is in Los Angeles County, thirty-three miles east of Los Angeles, with which it is connected by an automobile highway and an electric interurban line, and is on the Southern Pacific and the San Pedro, Los Angeles & Salt Lake railroads. In 1910 the population was 10,207; in 1920 it was 13,505 (a 32 per cent gain). The area of the city is twelve and one-half square miles.

Pomona is beautifully situated in the San Gabriel valley, a rich, irrigated area at the foot of the Sierra Madre Mountains. The prominent buildings are the city hall, Carnegie Library, Masonic Temple, high school, Pomona Valley Hospital and several fine churches; at Claremont, in the vicinity, is Pomona College (Congregational). The city has Ganesha Park (fifty-eight acres) and several small parks. Fruits, principally oranges and lemons, and nuts, grapes, grain and alfalfa are the largest crops. Pomona ships approximately 4,500 carloads of oranges and 750 carloads of lemons each year. The city has large canneries, fruit-packing houses, ice plants and creameries. Six miles distant is a sugar-beet factory, the annual output of which is worth more than $1,000,000.

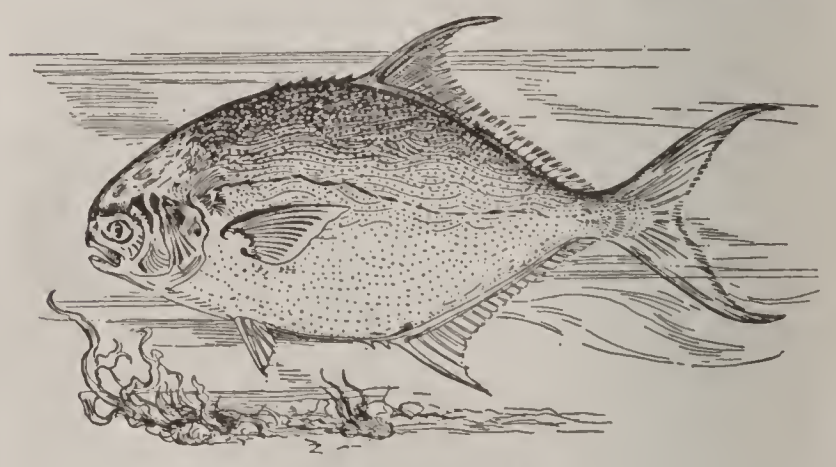
Pomona was settled in 1875 and incorporated in 1887. The commission form of government was adopted in 1911.

MADAME DE POMPADOUR

POMPADOUR, *pawN pa door'*, JEANNE ANTOINETTE POISSON, Marquise de (1721-1764), a mistress of Louis XV of France. Like most of the royal favorites who were elevated to temporary prominence, she was of lowly birth; but she had received an excellent education, and had been introduced to good society in the home of a wealthy financier. In 1741 she married Lenormant d'Etioles, and five years later went to live in Versailles as the king's mistress. She was given the title of Marquise de Pompadour, and allowed an annual income of one and one-half million francs (about $300,000). Her influence over the king, which was very great, she kept after his love for her had cooled, for she proved herself ready and able to provide him with entertainments and the riotous dissipation which he craved. Ministers depended on her favor, and important diplomatic points were decided by her.

Consult Williams' *Madame de Pompadour.*

POMPANO, *pom'pa no,* a group of valuable food fish belonging to the horse mackerel family, about a dozen species of which are found in the salt waters of America. The *common pompano* inhabits the waters along the



THE POMPANO

Gulf and South Atlantic coasts of the United States, and is found in the vicinity of the Florida Keys the year round, especially in the tidal inlet of Florida known as Indian River. This fish is a foot and a half long, has an average weight of seven or eight pounds, and is bluish above and silvery or slightly golden below, with yellowish breast. The body is oblong and flattened. The flesh of this pompano is highly prized for its rich and delicate flavor, and large numbers are caught in nets, especially on the Florida coasts. It is not a fish for anglers, for, according to one authority, "it never takes a hook except by mistake." Other species are the *round pompano,* which is found as far north as Cape Cod; the *great pompano,* largest of the group, which attains a length of three feet and inhabits the seas from the West Indies north to Florida; and the *silvery pompano,* a rare species occurring only from the West Indies to Brazil.

POMPEII, *pom pa'ye,* one of three Italian cities destroyed by the memorable eruption of Mount Vesuvius in A. D. 79. With Stabiae and

Herculaneum, it lay on the southern side of the great volcano, a prosperous city of 20,000 people. Founded in the sixth century B. C., it had become a Roman colony 159 years before the tragedy which ended its history. Wealthy Roman families had erected beautiful villas in its suburbs, and it was a favorite resort of the upper classes.

For over fifteen centuries after the eruption, the site of the buried cities was unknown. Pompeii lay at the mouth of the River Sarnus, there were showers of wet ashes and cinders, which, on drying, thoroughly sealed up the place. Its buildings have thus been brought to light in a remarkable state of preservation. The city was built in the form of an oval about two miles in circumference, and was surrounded by a wall pierced by eight gates. The streets, which regularly cross at right angles, are paved with blocks of basaltic lava, in which may be seen the ruts made by the wheels that passed over those thoroughfares so many centuries

THE BURIED CITY RESTORED TO THE KNOWLEDGE OF MAN

near the Bay of Naples, but the great disaster so changed the geography of the region—turning the river back from its course and raising the sea beach—that men had no way of discovering the site. In fact, for a long time its very name was almost forgotten. Then, by a happy accident, interest in the buried cities was revived. In 1748 a peasant who was sinking a well in that locality found some statues and other antiquities, and this led to extensive excavations in the region. The excavations are now carried on according to a systematic plan, and for this purpose appropriations are made by the Italian government. About half of the city has now been unearthed.

The city was buried under lava to a depth of twenty feet or more. In addition to the lava ago. In the center of the place is the open square or forum, typical of Roman cities; around it are grouped many important buildings—the ancient Temple of Jupiter, itself a ruin at the time of the eruption, the Basilica, temples and theaters. The unearthed private homes afford an interesting revelation of the social customs of the period. Not many valuables have been discovered, as it is supposed the fugitives from the city carried these away with them. Near Boscoreale, a costly silver table service was found at the bottom of a well, and other domestic treasures will doubtless be discovered as excavations continue in the region. Most of the movable objects have been placed in the National Museum at Naples, as have those of Herculaneum (which see). M.W.

Consult Mau's *Pompeii* (translation by Kelsey); Thomas's *Roman Life under the Caesars.* Also, Lytton's *Last Days of Pompeii* is recommended.

POMPEY, *pom'pi* (106-48 B.C.), the common English form of the name of GNAEUS MAGNUS POMPEIUS, the great Roman general and a member of the First Triumvirate. His first military training was received under his father in the war between Marius and Sulla, but he first did real personal service by his aid to Sulla in 83 B.C. By his own efforts he raised three legions and defeated the Marian armies in Italy, winning thus the command against the party of Marius in Africa and in Sicily. Victorius in both places, he received on his return to Rome a triumph, an unheard-of honor for a young man who had held no public office.

Early Service to the State. When Lepidus attempted to overthrow the constitutions of Sulla, Pompey effectually opposed him, and in 76 was sent to Spain, where the Marian party, headed by Sertorius, was still very strong. Even Pompey could make no headway against Sertorius, but after the murder of that brave leader in 71 B.C. he easily overcame all opposition, and on his return to Rome was given the post of consul with Crassus as his colleague. Meanwhile, though the people idolized him, the aristocratic party had come to look upon him with suspicion, because too much inclined to cater to the popular demands, and he proved the justice of their suspicions by restoring the office of tribune of the people. His military powers could not be denied, however, and in 67 he was intrusted with the task of freeing the Mediterranean of pirates. This difficult task he speedily accomplished, and in 65 B.C. he was placed in command of the Mithridatic War, Cicero delivering one of his most famous orations in favor of his appointment.

First Triumvirate Formed. He brought that long-drawn-out struggle to a close, subduing Pontus, Armenia and Syria and capturing Jerusalem, entering, it is said, the Holy of Holies in the Temple there. The Senate, however, still mistrusted him and refused to ratify his conduct of affairs in Asia, and in order to advance his interests he formed a coalition with Julius Caesar. Crassus, with whom Pompey had quarreled, was also reconciled and brought into the alliance, which thus became the famous First Triumvirate.

Pompey was married to Caesar's daughter Julia, and the two promised to respect each other's ambitions, but Pompey grew jealous of Caesar's ever-increasing fame, and after Julia's death openly turned against him. He induced the Senate, now more afraid of Caesar than of him, to demand that Caesar relinquish his command, but this the latter refused to do unless Pompey should resign his offices. Pompey in his turn refused, and Caesar, who was on a campaign in the north, promptly crossed the Rubicon and marched on Rome.

Flight and Death. Fleeing to Thessaly, Pompey was completely defeated by Caesar at Pharsalia, and escaped to Egypt; but as he was landing from his boat he was killed by one of his old centurions. His head was afterward presented to Caesar, who refused to look upon it and ordered the murderer's death.

Pompey was a remarkably successful general, but it must be remembered that for most of his achievements the way had been paved by the long and toilsome work of others. He was not a statesman but deserved honor for the purity and uprightness of his private life. A.MC C.

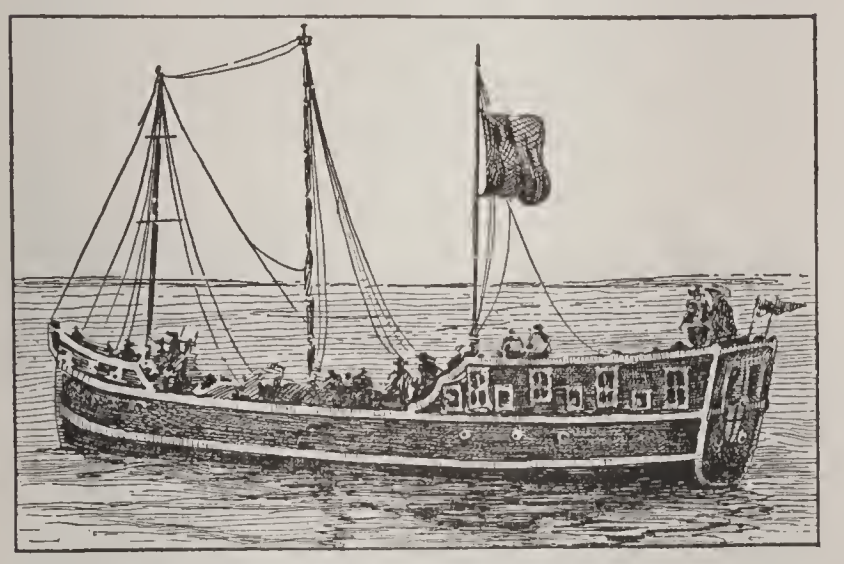
Consult "Life of Pompey," in *Plutarch's Lives;* Oman's *Seven Roman Statesmen of the Late Republic.*

Related Subjects. The following articles in these volumes will make clear the references in the above article on Pompey:

Caesar, Caius Julius
Consul, subhead *The Roman Consul*
Crassus, Marcus Licinius
Lepidus, Marcus Aemilius
Marius, Caius
Mithridates
Rubicon
Sulla, Lucius Cornelius
Tribune
Triumph
Triumvirate

PONCA, *pong'kah,* a tribe of North American Indians belonging to the Sioux family, the majority of whom are now living in Oklahoma and the remainder in Nebraska, on the Santee reservation. Originally they lived with the Omahas near the Red River of the North, but after many treaties with the United States government they settled at the mouth of the Niobrara River, near the Nebraska-Dakota boundary. There Lewis and Clark visited them in 1804, while on their expedition westward. Later the United States ceded the lands of the peace-loving Poncas to the Sioux, and in 1877 the tribe was forcibly removed to the present Oklahoma, where large numbers of them died. The following year they revolted and returned to the Omahas. Their sufferings aroused public sympathy, and in 1880 the rebels were pardoned and given the rights of citizenship. Later a part of the tribe was permitted to return to Nebraska. In all, the Poncas number fewer than 1,000.

PONCE DE LEON, *pohn'tha da la ohn',* JUAN (about 1460-1521), a Spanish conqueror and explorer, who discovered Florida while engaged in an effort to locate a fabled "fountain of perpetual youth." He served in the last war



PONCE DE LEON'S SHIP

In 1913 Florida celebrated the four hundredth anniversary of its discovery. The above illustration is from a photograph of the ship of the voyager, as reproduced for the occasion.

against the Moors in Spain, was with Columbus on his second voyage, and later was governor of the eastern part of Hispaniola (Haiti). His conquest of Porto Rico led to his appointment in 1510 as governor of that island, but his ambitions were not satisfied. He had heard from the Indians of an island named Bimini, which contained a marvelous fountain, in the waters of which old age could be thrown off and youth renewed, and in search of this he set out in March, 1513.

Land was sighted on March 27, and on Easter Sunday, April 8, he formally claimed the territory, which he named Florida, from *Pascua Florida,* the Spanish name for Easter. Later he sailed from his first landing place, near the present site of Saint Augustine, around the point and up the western side of the peninsula, which he still thought an island. Eight years later he returned to colonize his new territory, but was wounded in an encounter with the Indians and died before he could get back to Porto Rico.

See FLORIDA, subhead *History.* Consult Harris's *Discovery of North America.*

PONDICHERRY, *pon'de sher i,* a seaport in the southern part of India, on the eastern coast of the peninsula of Dekkan, just south of Madras. It is the capital of the tiny French territory of Pondicherry, and has a considerable export trade. The main industry is weaving of cottons and the chief exports are peanuts and peanut oil, cotton goods, indigo, fish, hides and rice. The town is built on a sandy beach on both sides of a canal. To the east is the European quarter, which has wide streets, spacious squares and fine buildings; to the west are the native hovels of dried brick or earth and an occasional heathen pagoda. Pondicherry was founded by the French about 1674; about twenty years later it was taken by the Dutch, but after three years was restored to the French with the fortifications much improved. During the Napoleonic wars it was in British hands several times; in 1816, however, it was finally given to France.

PONTCHARTRAIN, *pon chahr trayn',* a beautiful lake in Louisiana, noted as a summer resort, situated about five miles north of New Orleans, with which it is connected by the Bayou Saint John, a canal and a railroad. It is about forty miles long and twenty-five miles wide and is surrounded by a dense vegetation of water plants. It communicates with Lake Borgne on the east and with Lake Maurepas on the west. Mandeville and Madisonville, residential districts, are on the north shore. The name was given this body of water by the French.

PONTIAC, *pon'ti ak* (about 1720-1769), an American Indian chief, born in Northern Ohio. He early became chief of the Ottawa Indians and leader of the united tribes of Ojibways, Potawatomies and Ottawas, and he led their warriors against Braddock in 1755. He was friendly with the English between 1756 and 1760, but in the latter year was enraged by their advances into what he considered his domain. He determined to exterminate the British settlers of America and during the next two years organized the greatest confederacy ever known among savage people. It extended from the northern shore of Lake Superior to the Gulf of Mexico, and included practically every Indian tribe in the Mississippi Valley. How he contrived to keep this vast movement a secret for more than two years is yet a mystery to historians.

PONTIAC, THE OTTAWA CHIEF

On May 7, 1763, he was to attack Detroit, and the leaders under him were at the same

time to destroy fourteen other forts scattered southward almost to New Orleans. An Indian girl betrayed the secret to the commander at Detroit, and that settlement was saved after a long siege; but eight of the other fortifications were captured and several hundred soldiers and immigrants were massacred. Pontiac stubbornly held his ground at Detroit until October 12, 1764, when the starving defenders received aid. As peace had been declared between England and France, the chief could no longer receive French assistance, so he withdrew into Ohio. In August, 1765, he made a treaty of peace at Detroit. He was murdered at Cahokia, Ill., by a Kaskaskia Indian in 1769, and in revenge the Ottawas and their allies made war on the Illinois tribes, practically exterminating them. As an organizing genius Pontiac probably had no equal among American redmen.

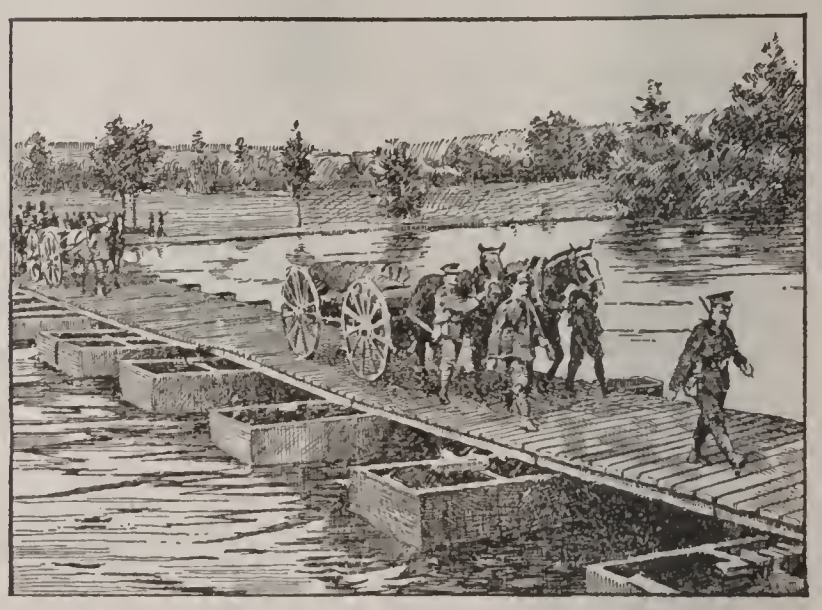
Consult Parkman's *Conspiracy of Pontiac.*

PONTIAC, Mich., the county seat of Oakland County, is situated in the southeastern part of the state, twenty-six miles northwest of Detroit. It is on the Clinton River and on the Pontiac, Oxford & Northern and the Grand Trunk railroads, and has electric interurban service to Detroit and other towns. In 1910 the population was 14,532; in 1920 it was 34,273, a gain of 136 per cent.

Pontiac is a summer resort in a lake region noted for its hunting and fishing. Within a radius of five miles of the city limits are twelve lakes. The city has the State Hospital for the Insane, a Federal building, courthouse, public library and city hospital. The principal manufactures are automobiles and automobile accessories, farm implements and foundry products. The place was settled in 1818 and was named in honor of the Ottawa Indian chief, Pontiac. It was incorporated as a village in 1837, became a city in 1861, and in 1911 adopted the commission form of government.

PONTIFEX, *pon'ti feks,* in ancient Rome any one of the members of the sacred society know as the College of Pontiffs. It was probably so named because its members were required to see that a certain bridge (*pons*) over the Tiber was kept repaired. To this college was intrusted the guardianship of all the rites and ceremonies connected with the worship of the gods. It also had charge of the calendar. Originally there were three pontifices, but the number gradually increased to sixteen. At the head of the college was the *pontifex maximus,* an official who held office for life and could not leave Italy. At the present time the latter title is borne by the Pope.

PONTOON, *pon toon'.* In the engineering corps of every army there is a division whose special work is the construction of temporary bridges. Such a bridge consists of a roadway of timber laid across a line of floating supports



ONE STYLE OF PONTOON BRIDGE

called *pontoons.* The pontoons may be flat-bottomed boats, metal cylinders or canvas-covered frames of bamboo. All the necessary materials for a bridge are carried by each pontoon division, and the equipment is so constructed that it can be packed into comparatively small space. The work of bridging a stream is done with mechanical precision, for in time of peace the pontoon division of a standing army practices all sorts of maneuvers in bridge laying. The chief danger arises when the work is done under fire from the enemy. In such cases relays of soldiers are sent across the river in boats to clear the way for the pontooneers. The latter lay the flooring, section by section, fastening it securely to the pontoons, which are placed side by side at equal intervals apart. Each pontoon is anchored with an upstream anchor, and at least every other one is secured with a downstream anchor as well. As a precautionary measure, extra pontoons are anchored above the bridge, to be used in case of accident.

Pontoon bridges are of limited strength, and in crossing them infantry must break step to prevent the swaying that would result from marching in time. Horses are led across, unmounted, and troops and wagons are kept certain distances apart. Under favorable conditions the engineers can put each pontoon into position in one minute and a half, and a river 600 feet wide can be bridged in less than an hour and a quarter.

PON'TUS, the ancient name of a region in the northeastern part of Asia Minor, bordering on the Black Sea. Originally Pontus was a part of Cappadocia, but in the third century B. C. it was formed into a separate kingdom and rose to great power under Mithridates the Great. Pontus was early Christianized, and under the Romans was an important point in their advance towards the Euphrates. In 1204 Alexius Comnenus formed a new kingdom in Pontus, which existed until conquered by Mohammed II in 1461.

The south and eastern portions of Pontus are mountainous, but along the coast the land

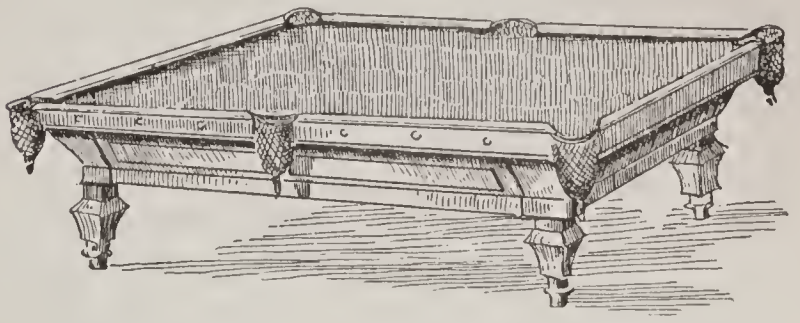
LOCATION MAP

The black area is Pontus; (*a*) is ancient Armenia; (*b*) Bithynia; (*c*) Galatia; (*d*) Cappadocia.

is very fertile and still produces grain, fruit and timber in abundance. In ancient times Pontus was noted for the culture of bees, and honey and wax formed the chief articles of commerce.

POODLE, *poo'd'l,* a breed of dogs much favored as house pets because of their intelligence and affectionate ways. The variety most commonly seen has a thick coat of white, curly hair, which may be clipped as fashion or the whim of the owner decrees. Other poodles are black, and still others are reddish. The hair may be short and tightly-curled, or it may hang in ropelike cords. Poodles vary in weight from twenty to forty pounds; they are well built, active and graceful.

POOL, the name of a number of different games played on a table similar to a billiard table, except that it has six pockets into which to roll the balls. Although a comparatively recent addition to billiards, the game of pool suggests a return to the very first known billiard tables, which had pockets or holes like those in a bagatelle board, generally six in number. The modern pool table measures five by



POOL TABLE WITH SIX POCKETS

Some tables are equipped with but four pockets —at the corners.

ten feet, standard size, but the tables used in public pool rooms are generally four feet six inches by nine feet, the same size as the average billiard table. There is one pocket at each corner, and one in the center of each side.

The game of American pyramid pool is one of the most popular forms of pool and is played with fifteen balls, of different colors and numbered from 1 to 15, and a white cue ball. The opener of the game plays with the white ball from anywhere behind the string, or balk line, at the fifteen balls, which are placed in triangular or *pyramid* formation at the opposite end of the table, the ball marked 1 forming the apex, standing on what is known as the *red spot.* After the first stroke the white ball must be played just as it lies, regardless of the string. The first player must strike the pyramid hard enough to send at least two balls to the cushion or at least one into a pocket. When only two are playing the player who first scores eight by forcing eight balls into the pockets wins the game.

In one plan of game the player must call the number of the ball he intends to pocket, and if the one called is not pocketed, though others may be, no ball is counted by the striker. All pocketed balls except the one called must be returned to the table. When the ball called is pocketed, the striker is entitled to count all others that are forced in by the same stroke. A player forfeits one ball when he shoots and does not hit a ball, forcing the cue ball off the table, or for pocketing the cue ball. A ball pocketed and scored by the striker must when forfeited be replaced on the table, on or as nearly as possible behind the red spot. If the striker incurs a forfeit before he scores a ball the first ball pocketed by him must be replaced on the table.

Fifteen-Ball Pool. This game is played with fifteen colored balls numbered from 1 to 15 and one plain white ball as the cue ball. The fifteen balls are placed in the wooden triangle on the table with the ball marked 1 as the apex of the triangle. The frame is withdrawn, leaving the 1 ball on the red spot, the other balls being arranged in more or less promiscuous order, except that usually the 2 and 3 are at the extremities of the base of the triangle.

The object of the game is to pocket as many balls as possible, the numbers on the balls pocketed added together making the score. The total of the numbers on the balls is 120, so when only two are playing the first to make 61 wins the game.

Bottle-Pool. This game is played on a pool table with three balls and a pool bottle. The 1 and 2 pool balls are used, and a white one for cue ball. The pool bottle is placed upside down on the center spot; the 1 and 2 balls must be placed at the foot of the table, one near each pocket, the right distance being marked by the diamond nearest each pocket on the rail of the pool table.

The first player strikes the cue ball from anywhere behind the string, aiming at the 1 or 2 ball, according to choice. The game consists of 31 points, and the player having the lowest score is adjudged the loser. Any number can play, each following in rotation, playing with the same cue ball. The scoring is as follows:

Carrom on the two balls..... 1 point
Pocket the 1 ball ..... 1 point
Pocket the 2 ball ..... 2 points
Carrom from ball and upsetting bottle 5 points
A player who makes more than 31 is *burst,* and must start afresh.

Pin-Pool. This game requires two white balls, one red ball and five wooden pins which are set on the table as shown in the accompanying diagram, with the 1 pointing to the head of the table.

```
    4
3   5   2
    1
```

The center pin (5) is black, and the value of the other pins, which are usually plain wood, is marked in chalk on the cloth alongside, where it may be seen by the players. The red ball is placed on the red spot, as in billiards. One white ball is placed on a spot in line with the center of the table, three inches from the cushion, with the pins between it and the red ball.

Each player receives a small ball with a number, keeping to himself the knowledge of the number. The pool is won by the player who scores exactly 31 by knocking down pins to make exactly that number when added to the number on his concealed ball. If a player makes more than 31 he *bursts,* and must start over again.

Carroms on the two balls count nothing. Pins only count. There is no forfeit for a miss or for forcing a ball off the table. If by the cue ball or object balls the four outside pins are knocked down leaving the 5 standing the player wins the pool regardless of his score. This is called a *natural.* F.ST.A.

For books relating to the various games of pool, see list at end of the article BILLIARDS.

POO'NA, a city and district in Bombay Presidency, India, headquarters of the Bombay army and government each year from July to November, when the climate of Poona is more healthful than that of the surrounding district. The city stands 1,850 feet above sea level, near where the rivers Mutha and Mula meet. Two miles from the city are the cantonments for the army. The city itself is divided into seven parts, each named after a day of the week. The native town is poorly built, squalid and unhealthful. The inhabitants formerly suffered terribly from the plague; in 1897 the death rate rose to ninety-three per 1,000 of the inhabitants. Between 1891 and 1901 the population decreased from 161,390 to 111,385. Stringent measures for eradications or restriction of the plague have done much since that time and the census of 1911 showed an increase to 158,856.

The city is supplied with water from the river Mula, an embankment and waterworks having been erected ten miles from the city. There are numerous educational institutions, including the Deccan College, established by the government, with European professors. Cotton mills, flour mills and dairies represent the chief industries. The district of Poona covers an area of 5,349 square miles, and has a population of 995,300.

POOR LAWS, a term which describes the general mass of legislation designed to assist the dependent poor. Civilized governments have always recognized that while the individual has duties he must render to society, he also has claims on society; among others is the right of assistance, when he, on his part, is unable to secure the necessities of life. All nations make laws covering such cases, but

only recently have such regulations formed the subject of scientific investigation.

Great Britain in 1905 appointed a Royal Commission for thorough study of conditions in that country. That body spent four years in investigation and then recommended most sweeping changes in the methods employed for helping dependents. The importance of the subject was emphasized and the necessity of applying modern methods was pointed out. In the United States and Canada care of the indigent is a recognized branch of social research work, supplementing state and provincial laws for the relief of the needy. The ideal sought to be realized is to afford needed relief, but in such a way as not to weaken the self-respect of the recipient.

POOR RICHARD'S ALMANAC, the name given by Franklin to the almanac which he published from 1732 to 1757, under the assumed name of *Richard Saunders*. Besides the usual material which an almanac contains, this publication of Franklin's had a large store of maxims and advice on such subjects as honesty, industry, frugality and patriotism. In the new country, where literature was none too plentiful, this almanac, with its wholesome common sense and its yearly sale of 10,000 copies, had a wide influence. Many quotations which are in everyday use are from *Poor Richard's Almanac;* among them are the following:

Early to bed and early to rise
Makes a man healthy, wealthy and wise.

God helps them that help themselves.

Never leave that till tomorrow which you can do to-day.

Three removes are as bad as a fire.

Little strokes fell great oaks.

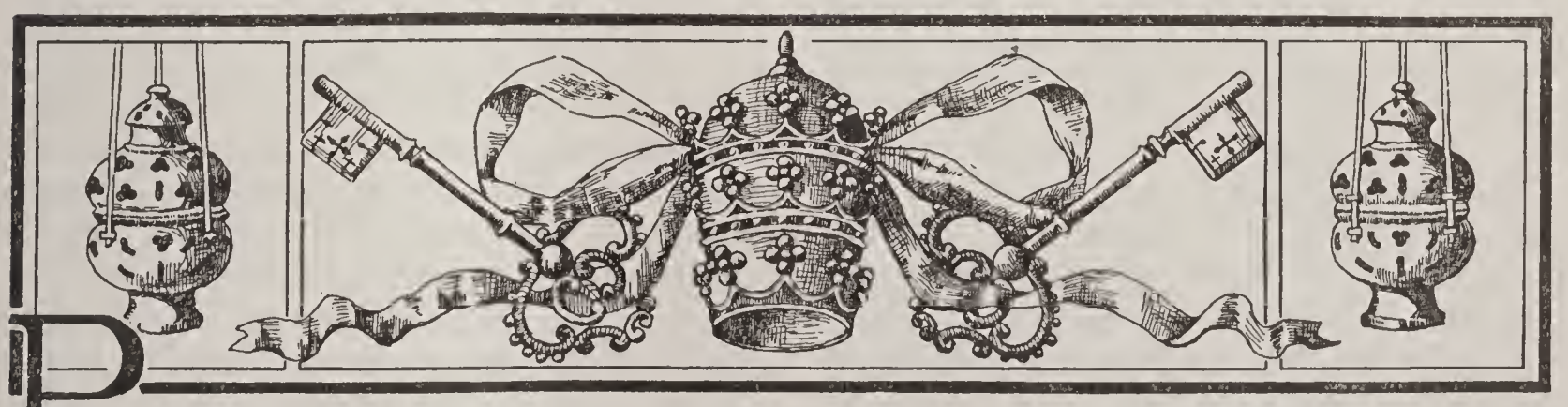
XII Mon. February hath xxviii days.

Man's rich with little, were his Judgment true,
Nature is frugal, and her Wants are few;
Those few Wants answer'd, bring sincere Delights,
But Fools create themselves new Appetites.
Fancy and Pride seek Things at vast Expence,
Which relish not to *Reason* nor to *Sense*
Like Cats in Airpumps, to subsist we strive:
On Joys too thin to keep the Soul alive.

M. D.	W. D.	*Remarkable Days, Aspects, Weather*	H. w.	☽ pl	☉ *rises and sets.*	*Lunations,* ☽ *rises & sets*
1	7	✶♃♀ plea	8	21	6 48	6 Last Quarter.
2	E	Sexagesima.	9	♐	6 47	6 ☽ with ♃
3	2	sant, with	10	19	6 46	6 Sirius so. 8 41
4	3	△♄♀ wind	11	♑	6 44	6 ☽ rise 3 42 mo
5	4	☐* set 10 and	12	15	6 43	6 *A good Wife &*
6	5	perhaps some	12	28	6 42	6 ♄ rise 9 7
7	6	rain ♂ ☽ ☌ ♀	1	♒	6 40	6 ☉ in ♓
8	7		2	24	6 39	6 ♀ rise 5 32
9	E	Shrove Sunday.	3	♓	6 38	6 New ☽ 9 day,
10	2	♃ rises 1 38	3h	18	6 37	6 at 3 morn.
11	3	Shrove Tuesday	4	♈	6 35	6 ☽ with ☿ ♂ & ♀
12	4	Ash-Wednesday.	5	12	6 34	6 ☽ sets 8 56 af.
13	5	✶♃♀△♄♀	5h	23	6 33	6 *Health, is a*
14	6	Valentine.	6	♉	6 32	6 *Man's best*
15	7	☽ near ☐*	7	17	6 30	6 *Wealth.*
16	E	1 Sund. in Lent	8	29	6 29	6 ♂ sets 7 18
17	2	clouds with	9	♊	6 28	6 First Quarter.
18	3	wind and	10	25	6 26	6 Sirius to 7 43
19	4	Ember Week.	10	♋	6 25	6 ☐* set 12 0
20	5	☐☉♃ rain	11	21	6 23	6 ☽ sets 4 2 mo
21	6	or snow.	12	♌	6 22	6 ♄ rises 8 11
22	7	then change-	1	18	6 20	6 *A quarrelsome*
22	E	2 Sund. in Lent.	2	♍	6 19	6 *Man has no good*
24	2	St. Matthias.	3	18	6 18	6 Full ● 24 day,
25	3	♃ rise 12 52	3h	♎	6 17	6 10 morn.
26	4	able even to the	4	15	6 15	6 ☽ with ♄
27	5	✶♄♃ very	5	♏	6 14	6 ☽ rise 9 53 aft.
28	6	☐♃♀ end.	6	17	6 13	6 *Neighbours,*

A PAGE FROM "POOR RICHARD'S ALMANAC"

POP CORN. See CORN, subhead *Varieties.*



POPE, *pohp,* the name of the father or spiritual ruler of the Roman Catholic Church, which great organization regards him as its visible head, Christ being the invisible head. The office of Pope was founded on the words of Christ: "And I say unto thee; that thou art Peter [which means *a rock*], and upon this rock I will build my Church; and the gates of hell shall not prevail against it" (*Matthew* XVI, 18). The attention of every historian has been attracted by the endurance of the Papacy through centuries that have seen the downfall of every other European institution that existed when the Papacy arose, and of a

number of others that have originated and fallen, while it continued to flourish. The Roman Catholic offers these facts as evidence that the Church is not merely a human institution but that it is built "upon a rock," despite the human weaknesses that have manifested themselves with the changes of time. The government of the Pope in spiritual matters is supreme, and through the power vested in him and the divine assistance promised him as the successor of Saint Peter, his teachings in doctrinal matters when he speaks *ex cathedra,* that is, in discharge of his office, are accepted as infallible.

Insignia of Office. The Pope ordinarily wears the garb of the other bishops, but this is always white in color; he wears out-of-doors a low, broad-brimmed hat. The tiara, the pontifical headdress, is used only in procession. His liturgical vestments are those of the bishops, but the pallium—a yoke of wool—is always worn when officiating. The pontifical ring and the cross of gold, containing a relic of the true Cross, constitute his jewels. He is addressed as "Your Holiness."

Election of the Pope. The Pope is elected by a two-thirds' vote of all the cardinals, who assemble as the College of Cardinals especially for that purpose. Their number varies from sixty to seventy, according to different Papal appointments. Closeted in a room which is made absolutely secure from intrusion and outside influence, they remain for hours or days, as need be, previous to the election, seeking divine assistance, through prayer, asking for the guiding light to direct them in their choice. Over the seat of each of the cardinals a canopy is arranged, and at the close of the ballot all the canopies are lowered save that of the successful candidate. The smoke issuing from the ballots, which are burned after the election, proclaims to the eager, excited throngs awaiting outside that a choice has been made. Upon his accession to the throne the Pope assumes a new name. Owing to the geographical position of Rome, and the fact that the majority of cardinals are Italians, the Popes for centuries have been Italians. The last one of foreign birth was Adrian VI, of Utrecht, who was elected in 1522.

Vicissitudes of Papal Power. The date of Peter's first appearance in Rome is disputed, but critics quite generally agree that he was there in A. D. 64, when the Christian community was already established, and that he built his church and suffered martyrdom there in the time of Nero. During the fourth and fifth centuries the Roman Primacy was enhanced in power, and definite recognition of its spiritual supremacy was manifested when Leo the Great, from 440 to 461, endeavored to preserve the Greek Church from the degeneracy into which it had fallen. Accordingly, in 451 a conclave of 630 bishops and four Papal legates assembled to hear the decree of Leo; they are reported to have exclaimed unanimously: "What Leo believes we all believe; anathema to him who believes anything else. Peter has spoken by the mouth of Leo." Despite the fact that the people of the East received the decree with resentment, all Italy turned to Leo when Attila, King of the Huns, devastated Europe and appeared before Rome. Upon being met by Leo, he withdrew without attack. Again the city was spared from fire and sword, through Leo's influence with Genseric, leader of the Vandals. During the next 300 years the Papacy accomplished the most arduous work that has fallen to the lot of an historic institution, that of spreading the faith among the Anglo-Saxons, the Visigoths, the Franks and the Lombards. About this time the Benedictine Order of Monks was founded, and they initiated the work of civilizing Europe. In 800, when Leo III, on Christmas Day in Saint Peter's Church, crowned Charlemagne Emperor of the West, pagan Rome lost its influence in the world.

The power of the Papacy gradually increased, literature was revived, and the soil of art and science was made fertile. However, in the midst of this power, the condition of the Papacy reflected the evils of the times; it became spiritually weakened by corrupt administration and disorders in elections, and by the sale of bishoprics and church property for personal gain. Church officers became the vassals of lords; consequently, it is not surprising that men were appointed to the Papacy merely in the interest of their rulers. These practices were abandoned when Otto the Great in 962 was crowned emperor. In less than 100 years the Roman clergy and laity were again empowered to select the Pope. In the middle of the eleventh century Pope Nicholas instituted the College of Cardinals, which was to choose the Pope, the choice to be confirmed by the emperor and approved by the clergymen and laity.

The pontificate of Gregory (540-604) is a luminous period in Papal history; he insisted on the celibacy of the clergy and suppressed

simony (buying and selling ecclesiastical offices), thereby accomplishing much for the spiritual elevation of the Papacy. During the pontificate of Innocent III, from 1198 to 1216, nearly every European ruler acknowledged the sovereignty of the Church. One of the heaviest blows to the temporal and spiritual power of the Pope was the removal of the Papal court from Rome to Avignon, France, in 1305, by Clement V, when the "seventy years' captivity" began. During this period all the Popes were French, and French influence prevailed, which greatly diminished Papal prestige. The return of the Popes to Rome was the beginning of the Great Schism of the West, but the Council of Constance restored order by the election of Martin V, in 1417. With the waning of temporal power, the spiritual supremacy of the Pope became more and more emphasized until attacked by the Protestant Reformation, which denied the dogmatic and moral teachings of the Church. The answer of the Church was clearly defined by the Council of Trent (1545-1563). See Reformation, The.

The Papacy received another severe blow when Pius VI, after the conquest of Italy by Napoleon Bonaparte, was compelled to sign the Treaty of Tolentino (1797), thereby suffering great territorial loss. During the reign of Pius IX the Piedmont government, to promote Italian unity, transgressed upon the Church domain. This ended in the seizure of Rome in 1870, when it was made the capital of United Italy (see Italy, subtitle *History of Italy*). The Pope, shorn of all temporal power, remains in Rome, living in the Vatican, where he maintains his own government, and outside of which he never appears. To Leo XIII, a man of rare intellectual power, is due the present spiritual influence of the Church, which never has been greater than in the twentieth century.

The income of the Pope is derived from the voluntary contribution of the faithful, known as "Peter's pence."

Subjoined is a list of the Popes, verified by the Roman Notizie (official register), with the dates of the beginning of their pontificates. The names of antipopes are printed in italics; an asterisk indicates that a biographical sketch is included in these volumes:

*St. Peter....A. D.	42	St. Telesphorus...	127	St. Zephirinus ...	202
St. Linus.....	66	St. Hyginus.....	139	*St. Calixtus I....	217
St. Anacletus.....	78	St. Pius I.....	142	St. Urban I.....	223
*St. Clement I....	91	St. Anicetus	157	St. Pontianus	230
St. Evaristus.....	100	St. Soterus	168	St. Anterus	235
St. Alexander I...	108	St. Eleutherius ...	177	St. Fabian	236
St. Sixtus I.....	119	St. Victor I.....	193	St. Cornelius	250
				St. Lucius I—*Novatianus*	252
				St. Stephen I.....	253
				St. Sixtus II.....	257
				St. Dionysius	259
				St. Felix I.....	269
				St. Eutychianus..	275
				St. Caius	283
				St. Marcellinus...	296
				(See vacant 3 years and 6 months.)	
				St. Marcellus I...	308
				St. Eusebius	310
				St. Melchiades or Miltiades	311
				St. Sylvester I....	314
				St. Marcus	336
				*St. Julius I.....	337
				Liberius	352
				St. Felix II (sometimes reckoned an antipope) ...	355
				St. Damasus I....	366
				St. Siricius	384
				St. Anastasius I..	398
				*St. Innocent I...	402
				St. Zosimus	417
				St. Boniface I — *Eulalius*	418
				St. Celestine I....	422
				St. Sixtus III.....	432
				*St. Leo I, the Great	440
				St. Hilary	461
				St. Simplicius	468
				St. Felix III.....	483
				St. Gelasius I....	492
				St. Anastasius II.	496
				St. Symmachus ..	498
				St. Hormisdas — *Lawrence*	514
				*St. John I.....	523
				St. Felix IV.....	526
				*Boniface II—*Dioscorus*	530
				John II	533
				St. Agapetus I...	535
				St. Sylverius	536
				Vigilius	537
				Pelagius I	555
				John III	560
				Benedict (I) Bonosus	574
				Pelagius II	578
				*St. Gregory I, the Great	590
				Sabinianus	604
				Boniface III	607
				St. Boniface IV...	608
				St. Deusdedit	615
				Boniface V	619
				Honorius I	625
				(See vacant 1 year and 7 months.	
				Severinus	640
				John IV	640
				Theodorus I	642
				St. Martin I.....	649
				St. Eugenius I....	654
				St. Vitalianus	657
				Adeotatus	672
				Donus or Domnus I	676
				St. Agathon	678
				St. Leo II.....	682
				St. Benedict II...	684
				John V	685
				Conon — *Theodorus; Paschal...*	686
				St. Sergius I.....	687
				John VI	701
				John VII	705
				Sisinnius	708
				Constantine	708
				St. Gregory II....	715
				St. Gregory III...	731
				St. Zachary	741
				Stephen II (died before consecration)	752
				Stephen III	752
				St. Paul I — *Constantine; Theophylactus; Philip*	757
				Stephen IV	768
				Adrian I	772
				*St. Leo III.....	795
				Stephen V	816
				St. Paschal I.....	817
				Eugenius II	824
				Valentinus	827
				Gregory IV	827
				Sergius II	844
				St. Leo IV.....	847
				Benedict III—*Anastasius*	855
				St. Nicholas I....	858
				Adrian II.....	867
				John VIII	872
				Marinus I, or Martin II	882
				Adrian III 884	
				Stephen VI	885
				Formosus	891
				Boniface VI (reigned only 18 days)	896
				Stephen VII	896
				Romanus	897
				Theodorus II—*Sergius III*.....	898
				John IX.....	898
				Benedict IV	900
				Leo V 903	
				Christopher	903
				Sergius III	904
				Anastasius III....	911
				Lando	913
				John X.....	914
				Leo VI.....	928
				Stephen VIII.....	929
				John XI	931
				Leo VII	936
				Stephen IX	939
				Marinus II, or Martin III	943
				Agapetus II.....	946
				*John XII — *Leo VIII*	955
				Benedict V	964
				John XIII	965
				Benedict VI	972
				Donus or Domnus II	974
				Benedict VII.....	975
				John XIV — *Boniface VII*	983
				John XV	985
				Gregory V — *John XVI*	996
				Sylvester II	999
				John XVI or XVII.1003	
				John XVII or XVIII 1003	
				Sergius IV 1009	
				*Benedict VIII — *Gregory VI* 1012	
				*John XVIII or XIX 1024	
				*Benedict IX (deposed) — *John XX* 1033	
				Gregory VI — *Sylvester III* 1045	
				Clement II 1046	
				Damasus II—*Benedict IX* attempts to resume the throne 1048	
				*St. Leo IX.....1049	
				Victor II 1055	
				Stephen X 1057	
				Benedict X 1058	
				Nicholas II 1058	
				Alexander II — *Honorius II* ...1061	

*Gregory VII (Hildebrand)—*Clement III*....1073
(See vacant 1 year.)
Victor III 1086
*Urban II 1088
Paschal II 1099
Gelasius II—*Gregory VIII*.....1118
*Calixtus II.....1119
Honorius II—*Celestine II* 1124
*Innocent II—*Anacletus II; Victor IV* 1130
Celestine II 1143
Lucius II 1144
Eugenius III.....1145
Anastasius IV ...1153
*Adrian IV (Nicholas Breakspear, an Englishman).1154
Alexander III—*Victor V; Paschal III; Calixtus III; Innocent III* 1159
Lucius III 1181
Urban III.....1185
Gregory VIII 1187
Clement III 1187
*Celestine III 1191
*Innocent III 1198
Honorius III 1216
Gregory IX 1227
Celestine IV 1241
(See vacant 1 year and 7 months.)
Innocent IV 1243
Alexander IV 1254
Urban IV 1261
Clement IV 1265
(See vacant 2 years and 9 months.)
Gregory X 1271
Innocent V 1276
Adrian V 1276
John XIX or XX or XXI 1276
Nicholas III 1277
Martin IV 1281
Honorius IV 1285
Nicholas IV 1288
(See vacant 2 years and 3 months.)
*St. Celestine V..1294
*Boniface VIII ..1294
Benedict XI 1303
Clement V (papacy removed to Avignon) 1305
(See vacant 2 years and 3 months.)
*John XXII 1316
Benedict XII—*Nicholas V at Rome* 1334
Clement VI 1342
Innocent VI 1352
Urban V—*Clement VII* 1362
Gregory XI (throne restored to Rome).....1370
*Urban VI.....1378
*Boniface IX—*Benedict XIII at Avignon* 1389
Innocent VII.....1404
Gregory XII.....1406
Alexander V 1409
*John XXIII 1410
Martin V—*Clement VIII* 1417
Eugenius IV—*Felix V* 1431
Nicholas V 1447
*Calixtus III.....1455
*Pius II 1458
*Paul II 1464
*Sixtus IV 1471
Innocent VIII....1484
*Alexander VI...1492
Pius III 1503
*Julius II 1503
*Leo X 1513
*Adrian VI 1522
*Clement VII 1523
*Paul III 1534
*Julius III 1550
Marcellus II 1555
*Paul IV 1555
*Pius IV 1559
*St. Pius V.....1566
*Gregory XIII....1572
*Sixtus V 1585
Urban VII 1590
Gregory XIV 1590
Innocent IX.....1591
*Clement VIII....1592
Leo XI 1605
*Paul V 1605
Gregory XV 1621
*Urban VIII 1623
Innocent X 1644
Alexander VII....1655
Clement IX 1667
Clement X 1670
*Innocent XI 1676
Alexander VIII...1689
*Innocent XII....1691
Clement XI.....1700
Innocent XIII....1721
Benedict XIII....1724
Clement XII.....1730
*Benedict XIV...1740
Clement XIII.....1750
*Clement XIV....1769
*Pius VI 1775
*Pius VII 1800
Leo XII 1825
Pius VIII 1829
Gregory XVI 1831
*Pius IX 1846
*Leo XIII 1878
*Pius X 1903
*Benedict XV 1914
*Pius XI 1922

See CARDINAL; ROMAN CATHOLIC CHURCH, in these volumes. Consult Von Ranke's *History of the Popes during the Last Four Centuries* (translated by Foster); Allies' *The Throne of the Fisherman;* Krüger's *The Papacy, Its Idea and Its Exponents.* J.S.C.

POPE, ALEXANDER (1688-1744), the most eminent English poet of the age of Queen Anne. He was born in London, of a Roman Catholic family. Because of his religion, his education was acquired in private schools and from tutors. Much of his learning, however, was the result of his own unaided and unsystematic study of languages and literature. He was unusually precocious, and composed an *Ode to Solitude* when but twelve years old.

In 1719, having fully made up his mind to devote himself to poetry, which had always been first among his interests, he went with his mother to live in a villa at Twickenham on the Thames, where the rest of his life was spent. He had already published two of his greatest works, the *Essay on Criticism,* in which the standards of literary judgment are set forth in elegant, flowing verse; and *The Rape of the Lock,* a mock-heroic epic, filled with sprightly humor and bright fancy and enlivened by the introduction of sylphs who control the development of the plot. *The Wife of Bath* and *The Temple of Fame,* adapted from Chaucer, next appeared. The most profitable of his undertakings from a money point of view was the translation of the *Iliad* and the *Odyssey,* the latter largely the work of assistants. Though excellent in themselves, these translations fail to preserve the simplicity of the original poems. Following these came the *Bathos, or the Art of Sinking in Poetry,* and the famous *Dunciad,* both directed against critics and adversaries, and both bitter as only Pope knew how to be. The fourth book of the *Dunciad,* written on purpose to ridicule Colley Cibber, the poet laureate, was not added until seventeen years later. Pope's last works were the *Moral Essays,* including the much-quoted *Essay on Man* and the excellent satires called *Imitations from Horace.*

ALEXANDER POPE

Though deformed and sickly, dwarfish in soul and body, "with little knowledge of the world of nature or of the human heart," he was the foremost poet of his age.

Pope is one of the most unusual of literary personalities. A hunchback from early childhood, and keenly sensitive to criticism, he was misled by his vanity and irritability into most malicious attacks on those who stirred up his envy or hatred. He turned on Addison, one of his best friends, and assailed him in an unjustifiable manner, but Addison bore it all with good humor. Pope was, however, capable of appreciation and of real loyalty to his friends, among whom were numbered such men as

Swift, Gay and Arbuthnot. The craving for approbation always drove him relentlessly, and most of his acts were dictated by it. As a poet he has been variously ranked by critics. In his own age his worth was overestimated, admirers declaring him the greatest of all English poets; in the following age of romanticisim, he was as much underestimated. Certainly his polished couplets, though they do produce the effect of monotony and artificiality, have done much to make excellence of form a necessity of verse. Pope is much quoted—more, perhaps, than any other English poet except Shakespeare. A.MC C.

Of his best-known sayings the following may be given:

Hope springs eternal in the human breast:
Man never is, but always to be blest.

Know then thyself, presume not God to scan;
The proper study of mankind is man.

Vice is a monster of so frightful mien
As to be hated needs but to be seen;
Yet seen too oft, familiar with her face,
We first endure, then pity, then embrace.

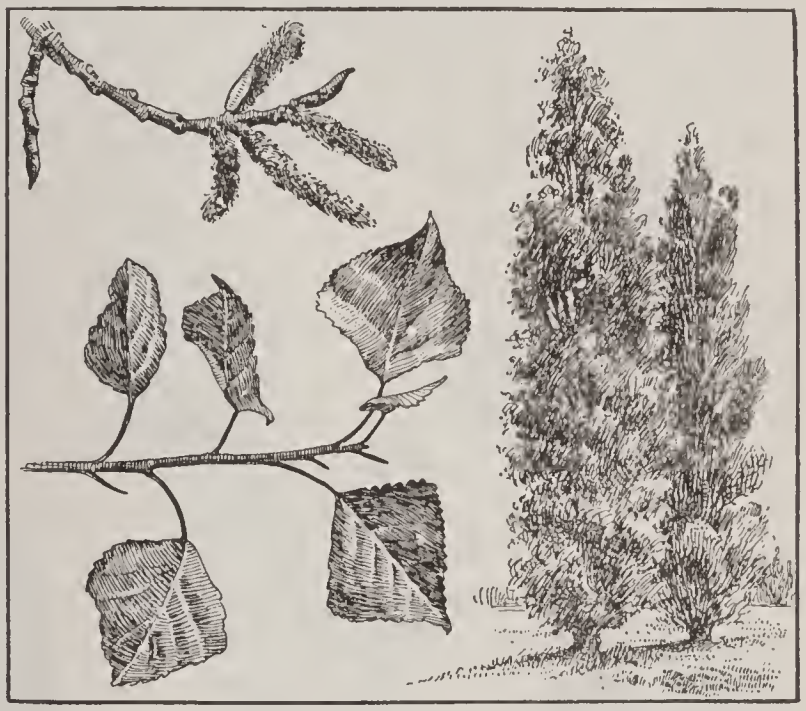
An honest man's the noblest work of God.

Consult Dennis's *The Age of Pope;* Stephens's *Pope,* in English Men of Letters Series.

POPE, Sir Joseph (1854-), a Canadian author and statesman, who first achieved prominence as the private secretary of Sir John A. Macdonald and later served with distinction in high positions. Sir Joseph was born at Charlottetown, Prince Edward Island, and was educated at Prince of Wales College in that city. In 1878 he entered the Dominion civil service, and in 1882 became private secretary to Macdonald. For the next nine years, until the latter's death, he retained this position, which presented an unusual opportunity to study the workings of the Canadian government and gave him an intimate acquaintance with most of the public leaders of the time. His *Memoirs of Sir John Macdonald,* although possibly prejudiced in Macdonald's favor, is a standard work. In 1896 Pope was appointed Undersecretary of State, and in 1908 Undersecretary for Foreign Affairs. He represented the Dominion government at the sessions of the joint High Commission at Washington in the years 1898 to 1900, and in 1903 was secretary of the Alaska Boundary tribunal. In addition to various papers on historical and political topics, Sir Joseph has written biographies of Champlain and Cartier.

POP'LAR, a family of rapidly-growing trees, with long-stemmed, quivering leaves and graceful, yellowish-red catkins. The tiny seeds have silky, cottonlike filaments which carry them through the air. There are eleven species native to America, and they grow in almost all parts of the continent, supplying a light, soft wood suitable for such articles as boxes and packing cases, and valuable also for making paper pulp.

The *cottonwood* and *aspen* belong to the poplar family, and an old legend tells that one species of the latter, known as the *Judas tree,* was the tree upon which Judas Iscariot hanged himself and that thereafter it trembled and



THE LOMBARDY POPLAR
Illustrating the form of the tree and appearance of the leaves and flowers. The latter are in the form of drooping catkins.

shuddered with horror. From this characteristic of poplars came the expression, "trembling like an aspen leaf" (see Judas Iscariot, subhead *Judas Tree*). The real reason for the quivering leaves of all the poplars is that the long, slight stems are flattened at right angles to the blade and a slight breath of air sets them fluttering with a sound like falling raindrops.

The tall, gaunt *Lombardy poplar,* with its close, upward-turning branches; the *balm of Gilead,* with fragrant, wax-covered buds, and the *white poplar,* of whose glossy green, silver-lined leaves Oscar Wilde says—

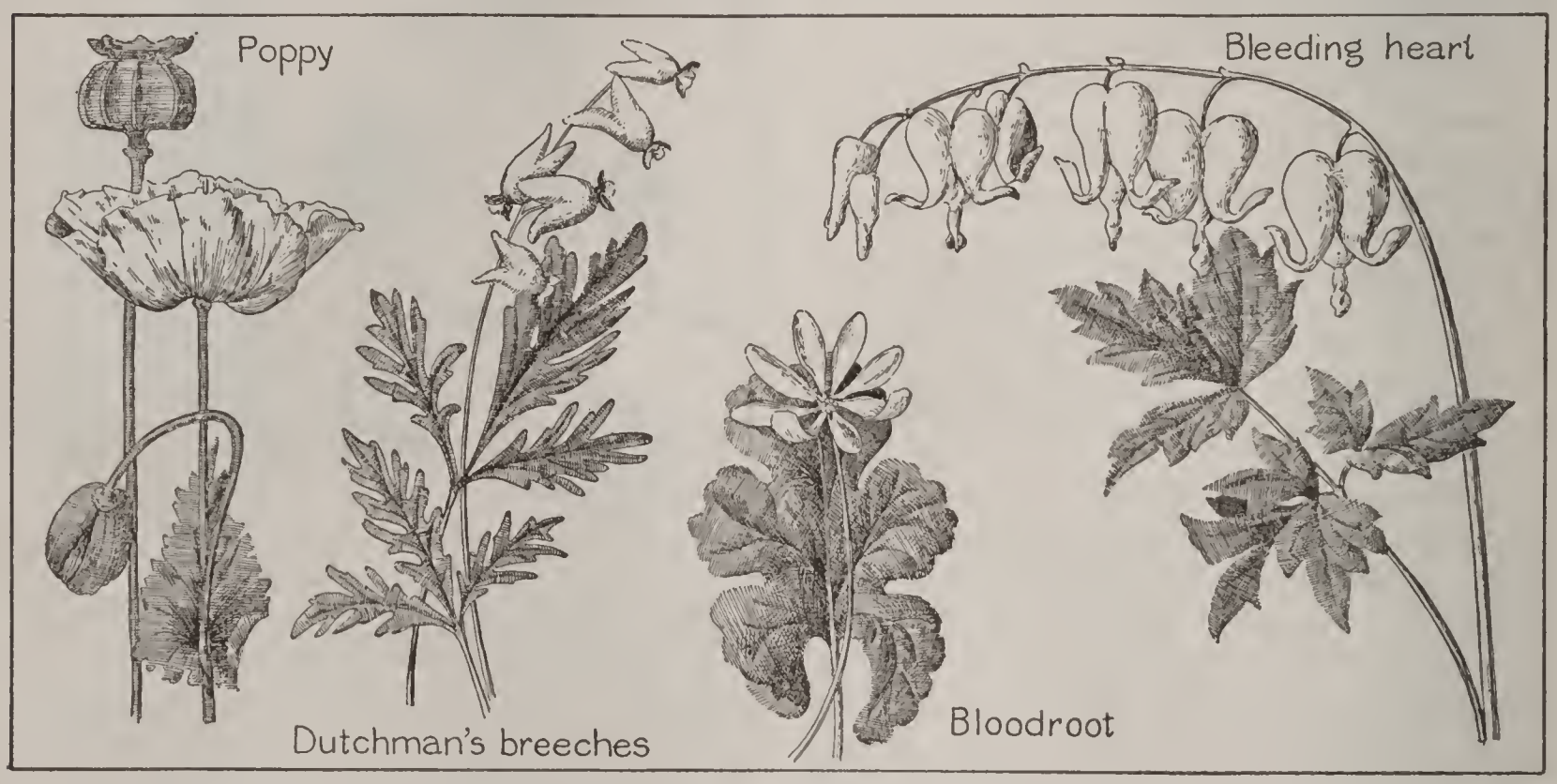
Like the silver gleams when the poplar trees
Rustle their pale leaves listlessly—

are all members of this interesting family.

POP'LIN, a fabric made of silk warp and worsted weft, somewhat resembling bombazine, except that it has the weft corded. It derives its name (*popeline,* in French) from the fact that it was first made at Avignon, the seat of the Popes from 1309 to 1376. Just how the original *popelines* were made is not known, but it is thought they were chiefly, if not

always, entirely of silk. Modern poplins add to the silk a worsted filling, which gives the cloth softness and substance. The worsted weft, being much heavier than the warp, gives the cloth a corded effect. Poplins are made in all colors, and are used extensively for dresses and for rich upholstery.

POPOCATEPETL, *po po kat' a pet' l,* a dormant volcano in Mexico, about forty miles southeast of Mexico City, one of the highest mountains in North America. It reaches an altitude of 17,520 feet, which is 2,780 feet less than the height of Mount McKinley, the loftiest peak on the continent. In the clear Mexican air the great white-topped cone, rising above the dark green of the forests on the lower slopes, appears to one in Mexico City very much nearer than it is. Though Popocatepetl has not been violently active for several centuries, clouds of smoke and gas, and sometimes ashes and stones, pour from its mouth; thus does it earn its name, which in the language of the Aztec Indians means *smoking mountain.* Mining engineers sometimes send Indians up to the crater to obtain native sulphur, which is found there in great quantities. These workmen make the descent by sliding down the steep, snow-covered mountainside.



SOME MEMBERS OF THE POPPY FAMILY

POPPY, *pop' i,* a family of flowering plants, the most important representative of which is the "garden hypnotist," the white sleep-producing poppy of China, India and Persia, in which countries it is raised extensively for the opium obtained from the milky juice of the young capsule. The *scarlet poppy* grows wild in the grain fields and grassy meadows of Great Britain and the continent of Europe. The *Iceland poppy* is a hardy variety, found in North America as far south as the mountain peaks of Colorado. Its flowers, in various shades of yellow, rose-pink and scarlet, last longer than most of these short-lived blossoms. The *California poppy,* or "cup of gold," grows wild in profusion in the "Golden State." When Luther Burbank saw among these yellow poppies one touched with scarlet, he gave it special attention and by cross-pollination produced a scarlet poppy. Other varieties are the deep red, *Oriental poppy,* which has a black-purple center and is the most magnificent of the family; the *prickly poppy* of the mesas of Colorado, and the huge *Matilya poppy* of Southern California.

The flowers of the poppies are admired for the delicate silkiness of their petals and for their graceful poise on the stem. Under cultivation numerous variations in the size and form of the blossoms have been brought about. The poppies are hardy plants and are easy to cultivate. The tiny seeds have no narcotic properties and are sold for bird food. They also yield an oil which is used in preparing dishes for the table and from which an oil cake is made which is a valuable cattle food.

POP'ULAR SOVEREIGNTY, *sov' er in ti.* See SQUATTER SOVEREIGNTY.

POPULATION. "The true greatness of a state consisteth essentially in population and breed of men" said the famous English philosopher Bacon. By *population of a country* is

meant the total number of men, women and children that compose the nation. The great truth contained in Bacon's thought is just beginning to be recognized. It is only in our day that it has been fully realized that the greatest asset of a nation is its number of healthy and happy men and women, and that its greatest source of future wealth is its boys and girls.

Number and Rate of Increase. During the century following 1814 the population of the world more than doubled. Never before had such a rapid increase in population taken place. It is estimated that in the first decade of the nineteenth century the world had, in round numbers, 700,000,000 inhabitants, while in 1920, two years after the end of the War of the Nations, the population was about 1,730 294,000.

The following table gives (in millions) the population of the continents according to the estimates of leading statisticians:

YEAR	EUROPE	AMERICA	ASIA	AFRICA	AUSTRALIA
1810	180	21	389	99	3
1920	484	165	830	142	8

For the half century preceding the year 1910 the rate of increase in several of the most rapidly-growing countries was as follows: 190 per cent in the United States, ninety per cent in Russia in Europe, sixty-two per cent in Germany, fifty-nine per cent in England, forty-six per cent in Hungary, forty-one per cent in Austria and ten per cent in France. For the whole of Europe the increase during that half century was fifty per cent, in spite of the fact that a large number of people left that continent to settle in other parts of the world, especially in America. At the present time Argentina is increasing its population faster than any other country in the world; the United States comes next.

Birth Rate. The increase in the population of the world has taken place in spite of the fact that the birth rate in most civilized countries has been steadily declining during the last few decades. To offset this there has been a gradual decrease in the number of children who die before they attain their first birthday. Yet the number of these innocent victims of disease, poverty and ignorance is still appallingly high.

Span of Life. Another factor that works for the increase of population is the fact that the span of life has lengthened; that is, that the average number of years each person lives is greater now than at any other time. People have a better chance to-day to live a longer life than ever before. This is due to the progress made by the science of medicine and to the greater attention paid both by individuals and by public authorities to hygiene.

Sex. Considering the population of the whole world, there are more males than females, the percentage being 50.3 per cent males and 49.7 per cent females. In Europe alone, however, the women outnumbered the men even before the War of the Nations shockingly decreased man power. This disproportion between the sexes was especially pronounced among the nations of Western Europe—England, Sweden, Norway, France and Germany. The greater number of men in North America and Australia, which have been benefited by the large immigration from the above mentioned countries, is not sufficient to make up for the deficiency in the European countries, and so the white race as a whole shows a tendency to develop communities where women form the majority of the population.

Urban and Rural Population. A striking change has taken place in the distribution of the population during the last hundred years. This consists in the massing of people in great towns, which have shown a phenomenal growth. This movement of the people from the country to the cities is due to the great industrial development of the nineteenth and twentieth centuries. The percentage of people living in towns has shown steady advance not only in Europe, but in less densely-populated parts of the world, as Canada, Australia and the United States. For example, only one-fifth of the population of England and Wales lived in cities in 1800, as against nearly four-fifths in 1910. In Germany less than one-tenth of the population were city dwellers in 1800, as compared with three-fifths in 1910. In France the increase was not so great; there only two-fifths of the population lived in towns in 1910, as compared with one-tenth in 1800. In the United States this movement shows the greatest development. In 1800 the proportion of those living in cities formed only 3.8 per cent of the total population; in 1910 nearly half of the inhabitants—46.3 per cent of the total population—were living in cities. See CITY. O.B.

Consult Woodruff's *Expansion of Races;* Weber's *Growth of Cities in the Nineteenth Century.*

Related Subjects. The reader is referred to the following articles in these volumes:

Baby
City
Life Extension
Life, Length of

POP'ULIST PARTY, or **PEOPLE'S PARTY,** one of the political parties in the United States that took a prominent part in the Presidential campaign of 1892. The official name was the PEOPLE'S PARTY, but as its members were called POPULISTS, this name was later, in common use, applied to the party. It resulted from the union of the several organizations which had existed as the result of unrest among the people. As a consequence of the unsettled state in which many questions of national policy were left after the close of the War of Secession and the natural reaction from the inflation of war times, agricultural interests experienced a prolonged season of depression. This led to the formation of a number of farmer organizations, such as the Grange movement of 1867 and the Farmers Alliance of 1879, whose object was to improve the condition of their members.

As a large element in these various parties believed that the ills from which they suffered were the result of mistaken legislation, they sought to remedy the trouble by taking an active part in politics. Some labor organizations, notably the Knights of Labor, were also thus attracted to the farmers' movement. The result was the organization of the People's Party, that being the name adopted by a convention of delegates from these different bodies that met in Cincinnati in 1891. The following year the party formally organized for participation in the national campaign, and state organizations were also perfected. James B. Weaver of Iowa was the party's nominee for President.

The most important planks of the platform adopted were those relating to finance. In general terms, they favored the free coinage of silver and a great increase in the issue of paper money by the government and its distribution directly to the people without the intervention of national banks. This implied more direct contact of the people with the government, in which the government should accept real estate and nonperishable farm products as security. In addition, they adopted a number of planks, not peculiar to their party but favored by a large element in both the old parties, such as postal savings banks, government ownership and control of public utilities, and the election of United States senators directly by the people.

The net results of the fall election showed that the new party had won an important position in the United States. It polled over 1,000,000 votes, securing twenty-two Presidential electors, five senators and ten representatives in Congress, about fifty state officers, and over 1,500 county officials and state legislators. But that was the high watermark of its achievement. In 1896 and 1900 it accepted as its nominee the Democratic candidate for President, William J. Bryan, but nominated its own candidate for Vice-President. In 1904 and 1908 Thomas E. Watson of Georgia was the party nominee, but he received only a few thousand votes. The party gradually disintegrated as the issues on which it was based were pushed aside. The question of free silver had ceased to be an issue in American politics, and the other planks in the platforms have been adopted at various times by the Democrats and the Republicans. The labor wing has partly united with the socialists, while the agricultural section has been absorbed by the two great parties from which it was drawn. O.B.

Consult Woodburn's *Political Parties and Party Problems in the United States;* Peck's *Twenty Years of the Republic.*

Related Subjects. The reader is referred to the following articles in these volumes:

Bryan, William Jennings
Grange
Greenback Party
Political Parties (subtitle *Political Parties in the United States*)
Weaver, James B.

PORCELAIN, *pawr'se layn,* or *pawrs'layn,* the name applied to those varieties of pottery that have a glasslike appearance. The word comes from the Italian word *porcelanna,* meaning *cowrie shell;* the latter is the name of a shell bearing a close resemblance to the white, glazed surface of this ware (see COWRIE). Porcelain is made from a variety of clay called kaolin (which see) and feldspar, or a clay containing a small amount of silica. The processes of manufacture are the same as those employed in making other varieties of pottery (which see). The Chinese invented porcelain, and it is from this fact that porcelain is called *china,* or *chinaware.* They are known to have manufactured it as early as 1000 B.C., and they still continue to make the most delicate and highly-prized wares; they are able to produce color effects which Western makers cannot equal.

The manufacture of porcelain was introduced into Europe in 1709, when a factory was established at Dresden by royal decree and placed under the direction of Johann Böttger, chemist to the elector of Saxony. This was the beginning of the manufacture of the famous Dresden china which has become a favorite ware throughout Europe and America (see DRESDEN CHINA).

Classes of porcelain known respectively as hard and soft porcelain are recognized in trade. Soft porcelain is of European manufacture and contains materials that do not enter into the real porcelain, to which the term *hard* applies. Many beautiful articles of soft porcelain are on the market, but they are less delicate than those of hard porcelain. Porcelain is the most expensive pottery made, and choice works command fabulous prices; the ordinary grades, however, are within the reach of those of moderate means and they make beautiful tableware.

Consult Hobson's *Porcelain of All Countries;* Dillon's *Porcelain.*

PORCUPINE, *pawr'ku pine,* a group of animals found in the forests of both hemispheres, whose chief peculiarity is the possession of strong, stiff quills, mixed with the coarse hair on the back and sides. These quills are the

THE PORCUPINE
In the illustration the animal is shown with his quills thrown forward—a characteristic attitude.

animal's principal means of defense, for, unlike squirrels, rabbits and other rodents—the order to which they belong—porcupines are slow-moving and dull-witted. Ordinarily the quills lie down smoothly, but when the animal is excited they stand sharply erect. That porcupines shoot their quills at their enemies is merely a legend, originating in the fact that the spines come out easily when touched. As these spines are fitted with numerous small barbs that pull them deeper and deeper into the flesh, a combat with a porcupine is a painful and often a dangerous procedure, and many an unwary hunting dog has retired from what seemed an easy conquest with his point of view entirely changed.

There are two main divisions of the porcupine family, inhabiting the forests of the New World and the Old World, respectively. The former are tree dwellers, but the latter live in burrows in the ground. Of the American porcupines the most common is a species found in the forests of Canada and of Northeastern United States. It is about three feet long, including the six-inch tail, and has yellowish-white spines from two to three inches in length. These quills, mingling with the black hair, give the appearance of a black and white coat. The home of this porcupine is a hollow log or crevice in the rocks, but during the day it is usually found in the trees. It feeds on green bark and twigs. The Canadian porcupine is a clumsy and stupid creature, and were it not for the protective coat of quills it would be quite at the mercy of its enemies.

In America the porcupine is sometimes called *hedgehog,* but the latter is a species not found in the western hemisphere. See HEDGEHOG.

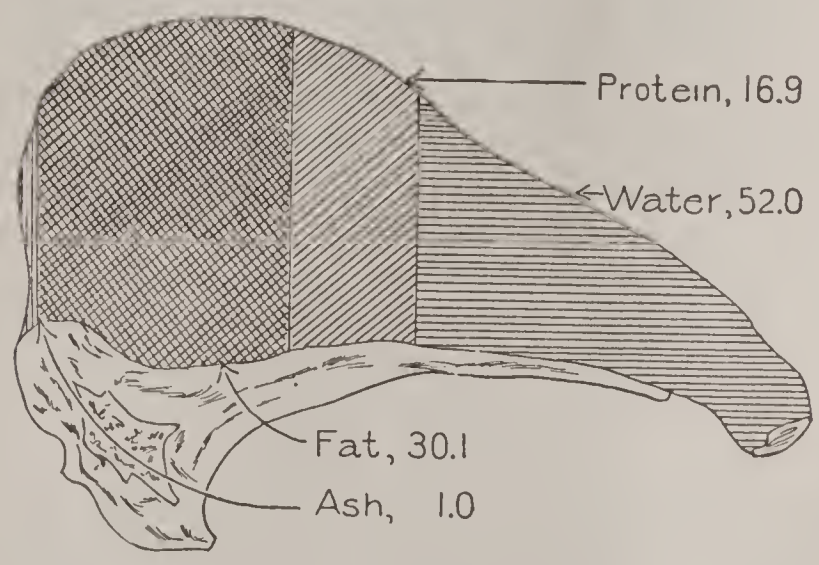
Consult Seton's *Life-Histories of Northern Animals;* Ingersoll's *Wild Neighbors.*

PORCUPINE, a town in Ontario, one of the greatest gold-mining camps in the world. The opening of this camp was responsible for the sudden increase in Ontario's gold production from $42,625 in 1911 to $1,788,596 in 1912, and approximately $10,000,000 in 1916. The town is situated on Porcupine Lake and on a branch of the Timiskaming & Northern Ontario Railway, 450 miles north of Toronto. It is about forty-five miles overland southwest of Cochrane, Ont. It is really composed of four settlements, Porcupine, South Porcupine, Schumacher and Timmins, all of which are mining camps. In 1911, the first year of the camp's prosperity, it suffered a disastrous fire, but it has since been rebuilt. Population in 1916, estimated, 6,000.

PORK, the flesh of swine, used extensively as a food. The different portions of the animal's carcass furnish varieties of meat which have special names. The flesh along the backbone (the chine) and the spareribs, corresponding to the loin in lamb and veal, are used for roasts, steaks and chops. Hams come from the thigh; the flesh on the shoulders is also prepared in the same manner as ham. The flank, directly below the ribs, furnishes bacon. A superior grade of fat salt pork is cut from the back, on each side of the backbone. The hocks, directly above the feet, are corned, that is, cured by salting, and are a much-enjoyed German food. The trimmings of both lean and fat

meat are used in making sausage. A delicacy known as pickled pigs' feet is prepared by boiling the feet of the pig and covering them with white-wine vinegar. Young, tender pigs are often roasted whole, their flesh being sweet, juicy and savory. Charles Lamb, in *A Dissertation Upon Roast Pig,* made this favorite dish world famous.

Pork as Food. Pork contains a larger percentage of fat than any other meat, and this fat is the most difficult to digest of all the flesh foods. It has, however, superior heat-producing qualities, salt pork possessing a fuel value



COMPOSITION OF PORK

of 3,555 calories per pound (see CALORIE); it is therefore a splendid diet for cold weather, but should be avoided in summer. Bacon is the most nutritious and most digestible of the pork meats. Pork lends itself to curing much more satisfactorily than either beef or mutton, and its flavor grows richer and more delicate with the passage of time. Cured pork products are therefore among the most useful of meat foods. The dishes prepared from pork are almost beyond number, for there seems to be no end to the ways in which it can be cooked or combined with other foods. The United States Department of Agriculture especially recommends as savory and palatable dishes the old-fashioned salt-pork milk gravy, and cowpeas baked with salt pork or bacon in the same manner as pork and beans.

Objections to Pork. Because of the indiscriminate and unlimited appetite of the swine, the eating of pork has, in the past, been subject to severe criticism. It is true that pork, more than any other meat, is responsible for introducing parasites into the human body, but it is equally true that the careless, unsanitary methods of feeding that formerly prevailed are being gradually replaced by wholesome and scientific methods. The best modern breeders are as careful about the hog, with respect to diet, as they are with any other stock. The flesh of a hog which has been bred in a cleanly manner is as wholesome as beef or mutton. However, pork should never be eaten without being thoroughly cooked.

From time immemorial the Jews have had religious scruples about eating pork, for in Bible times the swine was regarded as an unclean animal, and the eating of its flesh was forbidden by the Mosaic law. This prejudice was not confined to the Jews alone, however, as the Arabians, Egyptians and other Oriental peoples had similar beliefs on the subject.

As an Industry. The pork-packing industry has grown to huge proportions in the United States, where about 25,000,000 hogs are slaughtered annually. Chicago does about thirty-five per cent of the business, with Kansas City ranking second. In Canada an average of 3,400,000 hogs are slaughtered yearly, in seventy slaughtering and meat-packing establishments and on farms. The details of this great enterprise are included with other statistical matter in the article MEAT AND MEAT PACKING. B.M.W.

Related Subjects. In addition to the references mentioned, the reader is asked to consult the following articles in these volumes:

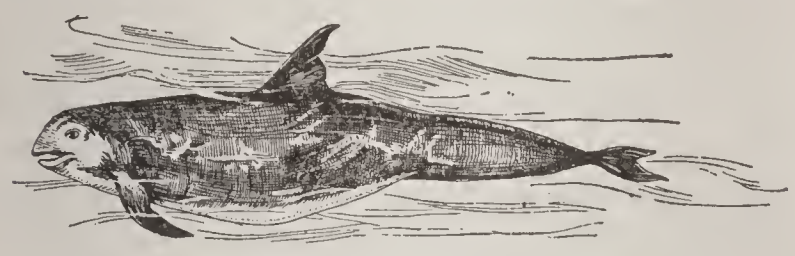
Calorie	Ham
Food	Hog

POROSITY, *po ros'i ti.* If you pour water into a flask until its level is up to a certain mark on the glass and then, very slowly, sift fine salt into the water, you will find that you can add a considerable amount of salt before the water level rises. Also, if alcohol is poured into a flask containing water the final volume of liquid is less than the original volumes. These experiments illustrate a general property of matter—*porosity*—the property of having pores. All matter, regardless of its structure, has spaces between its molecules. In the first experiment salt particles filled the spaces between the particles of water; and in the second, some of the water molecules slipped into the spaces between the alcohol molecules. Even the most solid-appearing substances are somewhat porous; by hydrostatic pressure water can be forced into the thick metal of a cannon until it runs out in tiny streams.

PORPHYRY, *pawr' fi ri,* a spotted or speckled rock, whose peculiar appearance is due to the scattering of large crystals of one mineral more or less evenly through the mass of the rock, which is formed of some other mineral. In most porphyries feldspar forms the mass. Porphyries vary in color from nearly white to al-

most black, and are grouped into two classes, light and dark. They are hard, take a high polish and are valuable building stones. See FELDSPAR.

PORPOISE, *pawr'pus,* a group of sea mammals belonging to the same order as the dolphins and the whales (see CETACEA). The best-known species is the common porpoise of the northern hemisphere. It is from six to eight



THE PORPOISE

feet long, and is covered with a smooth, hairless skin, black on the upper part of the body and white below. It has a short, beakless muzzle, and a blowhole placed between its eyes; its jaws are provided with from forty to fifty teeth each. This porpoise is a relentless hunter of herring, mackerel and salmon, and to capture the latter it will venture into rivers, where it frequently falls a prey to fishermen. Porpoises swim high in the water, and a school of them, with their shiny backs visible above the waves, is an interesting sight. Porpoise flesh is not popular as food, but a fatty layer beneath the skin yields an oil of commercial value. A good quality of leather is obtained by cutting down the thick skin of the animal. See WHALE; DOLPHIN.

PORTAGE LA PRAIRIE, *pohr tahzh' la preh ree'*, a city in the south-central part of Manitoba. It is on the Assiniboine River and on the main line of three great transcontinental railways, the Grand Trunk Pacific, the Canadian Pacific and the Canadian Northern. It is also served by several branches of these railways, and by a branch of the Great Northern, connecting with the main line of that railway at Grand Forks, N. D. Portage la Prairie is fifty-six miles west of Winnipeg, seventy-seven miles east of Brandon, and about fifteen miles south of Lake Manitoba. It takes its name, which means *portage over the prairie,* from the fact that the Indians and the early traders at this point began the portage from the Assiniboine River to Lake Manitoba. Population in 1911, 5,892; in 1921, 6,766.

Portage la Prairie is in many ways a typical Western city. Its large grain elevators, its flour and oatmeal mills, indicate the character of the surrounding district. The Portage plain, in fact, is famous as a section where crop failures are unknown. The city has many manufacturing establishments, including brickyards, lumber yards and factories for making farm implements and machinery, steel grain bins, structural iron castings and pumps. The city owns and operates its waterworks, installed in 1907, and its electric-lighting plant, which was privately owned previous to 1911.

Attractive features of the city are the many trees, an unusually large number for a Western city. Also noteworthy is Crescent Lake, in which lies the pretty Island Park, of thirty-five acres. Only fifteen miles away is Lake Manitoba, which provides fishing and boating for the summer months and makes Portage la Prairie a popular summer resort. The city is the seat of the central judicial district, and has the government buildings and courthouse. The post office and the armory are splendid buildings, as are also the general hospital, the Industrial Training School, the Old Folks' Home, the Home for Incurables, and the Indian school maintained by the Presbyterian Church. W.R.G.

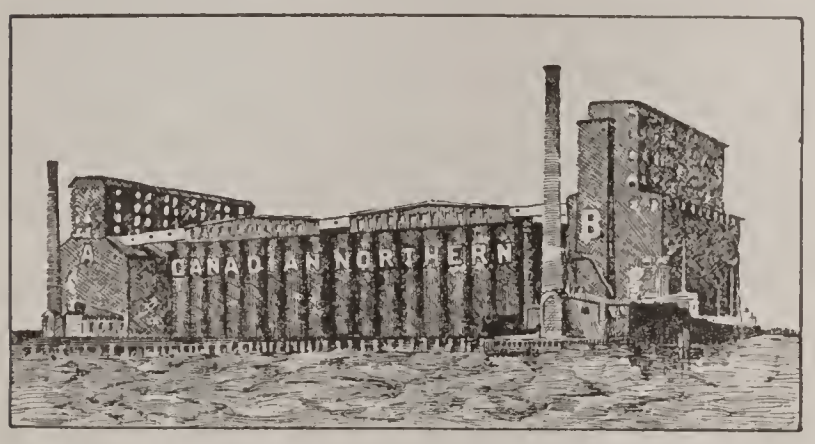
PORT ANTONIO, *an to'ni o,* JAMAICA, a seaport town lying between two sheltered harbors on the northeast coast of Jamaica. It is the second commercial port of the island, ranking next to Kingston, and owes its prosperity chiefly to the fruit trade, of which it is the center. It is a typical Jamaican town, with quays piled with fruit for shipment and frequented by lolling negroes; and narrow, mean streets crowded with black market women carrying their produce in large baskets borne upon their heads. The population in 1911 was 7,074. See JAMAICA.

PORT ARTHUR, the terminus of the South Manchurian Railway, is an important Japanese naval station in the province of Shengking, Manchuria, situated at the extremity of the Liaotung peninsula, which projects from the mainland in a southwesterly direction. Port Arthur is located on the Strait of Pechili, an oval-shaped inlet of which forms a fine landlocked harbor. About the harbor is a ring of high, barren hills, and on their slopes the town is built; the harbor, which has been enlarged and improved, is free from ice the year round. The Japanese maintain a regiment of soldiers here, and have so strongly fortified the place that it is considered impregnable. In 1922 it had a population of about 19,000, consisting chiefly of Japanese and Chinese.

Port Arthur, originally a small Chinese fishing village, became world famous when it was converted into a fortified naval station to guard

Peking. Though captured by the Japanese in the war of 1894 (see CHINESE-JAPANESE WAR), it was evacuated by them through the intervention of Germany, France and Russia. Eventually it was leased by the Russians and made a strong naval base, but was in turn taken from them by the Japanese during the Russo-Japanese War (which see). The Treaty of Portsmouth (1905) provided for the cession of Port Arthur to the Japanese for the remainder of the period specified in the lease, and an extension of the lease was secured in 1915.

PORT ARTHUR, a city in Ontario, in the Thunder Bay district. It is situated at the head of Lake Superior, and with its rival, Fort William, divides the Canadian water traffic between Great Lakes' ports and the West. It is



A PORT ARTHUR GRAIN ELEVATOR

The largest structure of the kind in the world. Boats are loaded and unloaded automatically; when a steamer comes here for a cargo of wheat it can be filled in four hours.

also an important railway center, being a divisional point on the main lines of the Canadian Pacific and the Canadian Northern railways. By rail it is 872 miles northwest of Toronto, 988 miles northwest of. Montreal, and 423 miles east of Winnipeg. Duluth is about fifty miles directly southwest of Port Arthur. Its location, together with its excellent facilities for shipment by rail and water, has made it a great collecting and distributing point, especially for the grain-growing Canadian Northwest. Over 100,000,000 bushels of grain each year pass eastward through the ports of Fort William and Port Arthur. The grain elevator of the Canadian Northern Railway, with a capacity of 10,000,000 bushels, is said to be the largest elevator in the world. There is also a large Dominion government elevator, one of the system of interior storage elevators.

In addition to its grain interests, Port Arthur receives and ships vast quantities of coal, iron ore, fish and lumber. The blast furnaces, a dry dock and shipbuilding plant, sawmills, foundries and coal and ore docks are among the large establishments. There are a number of noteworthy buildings, including the public library; the armories; the post office; the splendid collegiate institute, one of the finest in Canada; and the Whalen office building, which cost $350,000. The city owns and operates its public utilities—the street railway since 1891; waterworks and electric-light plant since 1895, and telephone since 1903. Current River Park (350 acres) and Lyon Park (ninety-nine acres) are attractive pleasure spots.

Port Arthur was founded in 1888. It was first known as Prince Arthur's Landing, in honor of Prince Arthur, Duke of Connaught, who was later Governor-General of the Dominion. Since its incorporation as a city in 1907 it has been known as Port Arthur. Population in 1901, 3,214; in 1911, 11,220; in 1921, 14,886. F.F.M.

PORT-AU-PRINCE, *pohr toh praNs',* or *pohr toh prins',* is the capital and principal seaport of the republic of Haiti, West Indies. It is on the western coast of the island, and has a good harbor in the well-sheltered Bay of Conaives. The town is built on a low, marshy shore at the foot of the hills surrounding the bay, and although it is well laid out with wide, regular streets, the buildings are very poor. All of them, even the palace and cathedral, are of wood, and many are half in ruins. The people are mostly mulattoes or negroes, very ignorant and lazy, who speak a French dialect. Port-au-Prince has twice been destroyed by earthquakes, once in 1751 and again in 1770, and many times large sections of the town have been burned. Since the withdrawal of the French, who founded the town in 1749, the country has been so mismanaged that the commerce has greatly decreased, and the city shares with the remainder of the republic in this misfortune. The chief exports are cabinet woods, coffee and cocoanuts. Population, 1920, 120,000. See HAITI.

PORT CHESTER, N. Y., in Westchester County, is a summer resort and a residential suburb, twenty-three miles northeast of New York City, in the southeastern corner of the state. It is on Byram River, a short distance from Long Island Sound, and is served by boats, by the New York, New Haven & Hartford Railroad and by an electric line. The city covers an area of two square miles and has several small parks, the Jared V. Peck Memorial Library, the United States Hospital and a $132,000 high school. Among the industrial establishments are bolt and nut works, iron foundries, cabinet and blind factories, and

manufactories of shirts, sheets and pillow slips, gas stoves and other commodities. Settled about 1742 and known as Saw Pit until 1837, Port Chester was incorporated as a village in 1868. The population, which in 1910 was 12,809, was 15,129 (state census) in 1915, and was 16,573 in 1920. C.D.C.

PORT COLBORNE, *kol'bohrn,* a town in Welland County, Ontario. It is situated on the north shore of Lake Erie, at its eastern end, and is at the southern end of the Welland Canal. Its harbor is excellent, being deep enough for the largest lake steamers, and its docking facilities are ample. It is also served by two railways, the Grand Trunk and the Canadian Northern. By rail it is twenty-four miles west of Buffalo and about twenty miles southwest of Niagara Falls, whence it derives electric power for its industries. These include a planing mill, large flour and grist mills, and a cork factory. There is also one of the Canadian government's great grain elevators. Pig iron is another important product, and nickel will soon be added to the list, for a $3,500,000 nickel refinery is being erected by the International Nickel Company. Natural gas and a good quality of limestone are found in the vicinity. Port Colborne was named for Sir John Colborne (Baron Seaton), who was lieutenant-governor of Upper Canada when the Welland Canal was completed in 1833. Population in 1911, 2,250; in 1921, 3,415.

PORT ELIZ'ABETH, a town and seaport in South Africa, in the Cape of Good Hope Province, ranking next in importance to Cape Town, the capital. It is situated on Algoa Bay, about 435 miles directly east of Cape Town and about 380 miles southwest of Durban, on the slopes and top of hills which rise about 200 feet above the sea. For the most part the city has a barren, treeless appearance, and is not in any way remarkable for beauty. As a commercial center, however, it is of great importance, and has earned the name of the "Liverpool of South Africa."

One of the most remarkable buildings in the city is the Feather Market Hall, where annual sales of ostrich feathers are held. The town hall, post office, courthouse and public library possess considerable architectural merit. The residential district is known as "The Hill." Here there is a fine monument to Sir Rufus Donkin, who established the town and whose wife Elizabeth gave it her name.

Port Elizabeth has no protected harbor, but the roadstead has excellent anchorage, and vessels drawing twenty-one feet of water are able to tie up alongside the jetties which run out to a depth of about twenty-five feet. From the jetties there is railway communication with the main lines, and goods may be sent direct from ships to all parts of South Africa. There is a vast import trade, for the port is a supply port for Kimberley, the Transvaal, Orange Free State Colony and Rhodesia.

Algoa Bay, on the shore of which the city stands, was discovered by Bartholomew Diaz in 1488 and was first named Bahia da Roca (Rocky Bay). The name was eventually changed to *Bahia da Lagoa* and finally corrupted into *Algoa.* In 1799 the British erected a fort on a hill overlooking Baaken's River, naming it Fort Frederick. A few houses were built round the fort, and the influx of immigrants led to the formation of a small town. Fort Frederick is still preserved on account of historic interest.

PORTER, the family name of two men, father and son, whose careers added luster to the annals of the American navy. The son and an adopted son became the first two admirals of the navy.

David Porter (1780-1843) was the first of the two. He was born in Boston. His father was a naval officer in the American Revolution, and David served for a time on merchantmen, being twice captured by the English. In 1798 he joined the American navy as midshipman. The next year, as lieutenant, he served on the *Constellation,* then went to Tripoli on the *Philadelphia* and was taken prisoner (see BARBARY STATES).

DAVID PORTER

At the beginning of the War of 1812, Porter was given command of the *Essex;* with it he captured several English prizes, and the next year was commissioned to harass English whaling vessels in the Pacific Ocean. On this cruise he was accompanied by the boy, David G. Farragut, whom he had adopted, and who afterwards became an admiral. Just after starting, the *Essex* captured two British vessels, and the English prisoners conspired to gain possession of the ship. Farragut overheard the plot, and enabled Porter to frustrate it. In three weeks

he captured nine prizes, taking them to Valparaiso, Chile, for safety.

Later, encountering the English ships *Cherub* and *Phoebe,* the *Essex* was forced into an unequal combat in really neutral waters, and was compelled to surrender; nevertheless Porter was received with great enthusiasm on his return. He was then made a commodore and put in charge of the expedition against pirates in the West Indies. At Foxardo there was some trouble, and Porter made the Spanish apologize for insulting the American flag. He was then charged with exceeding his authority and was suspended for six months. Incensed at this decision, Porter resigned, publishing a defense of his action (1825), and enlisted as rear-admiral in the Mexican navy, remaining there until 1829. President Jackson then appointed him consul-general to Barbary, and later as *charge d'affaires* at Constantinople, where he died in 1843. He published a book on *Constantinople and Its Environs.*

David Dixon Porter (1813-1891), an American naval officer who, during the War of Secession, was four times voted the thanks of Congress for distinguished service, and was the second man to hold the rank of admiral in the United States navy. He was born in Chester, Pa., the son of Commodore David Porter, and when only eleven years old accompanied his father on a cruise against pirates in the West Indies. Later he served as midshipman in the Mexican navy, his father having taken service with that country. Under his cousin, Captain David H. Porter, he fought in a fierce battle with a Spanish vessel and was captured. Joining the United States navy as midshipman after his release in 1846, Porter was sent on a secret diplomatic mission to Haiti, and later held command of the *Spitfire* in the Mexican War.

DAVID D. PORTER
The second man to become admiral of the United States navy.

When the War of Secession broke out he was ranked lieutenant, served on the *Powhatan* at Fort Pickens, and soon rose to the rank of commander. In the Mississippi River campaign, Porter was offered the command of the Gulf blockading squadron, but declined in favor of Farragut.

In the bombardment of Forts Jackson and Saint Philip, in which he was second in command, he threw 16,000 shells, making it possible for Farragut to take his ships past the forts and attack New Orleans. Four days later, Porter captured the forts, and then served between New Orleans and Vicksburg. In 1862, as acting rear-admiral, he took charge of the Mississippi squadron, and in the siege of Vicksburg shared the honors of victory with Grant. The rank of rear-admiral was then conferred on him.

As commander of the North Atlantic blockading squadron Porter coöperated so admirably in the attack on Fort Fisher (1865) that he was thanked by Congress and the President. The next four years he was superintendent of the Naval Academy at Annapolis, where he instituted many improvements. In 1866 he was promoted to be vice-admiral, and at Farragut's death (1870) succeeded him in the highest naval rank in America, thus becoming the second admiral in the American navy. He published a number of literary works before his death in 1891. See ADMIRAL. C.H.H.

Consult Johnson and Buell's *Battles and Leaders of the Civil War;* Homan's *Our Three Admirals.*

PORTER, GENE STRATTON (1868-), a popular American writer, famous for the stories which she calls "nature studies, sugar-coated with fiction." In all of these there is a background of outdoor life, for she has always made her home in the country, where she could study the birds, moths and plants. She has expressed her chief object in writing as her desire "to draw the readers into closer touch with Nature and the Almighty." Many of her stories and nature articles are illustrated with her own drawings and photographic studies.

GENE STRATTON PORTER

Mrs. Porter, who is the wife of Charles Darwin Porter, was born at Hopewell Farm, Wabash, Ind. Her first professional work consisted of photographic studies of natural history subjects, which she contributed to *Recreation.* She was given charge of the "Camera Department" of that magazine, later became a member of

the natural history staff of *Outing* and still later of the *Photographie Times Annual Almanae.* Her first stories were magazine contributions, their success prophesying the wide popularity of her novels. Her second novel, *A Girl of the Limberlost,* was translated into Arabic to be used in the introduction of American methods of nature study into the College of Cairo, Egypt.

Her best-known works are *The Song of the Cardinal, Freckles, What I Have Done with Birds, At the Foot of the Rainbow, Birds of the Bible, A Girl of the Limberlost, Musie of the Wild, The Harvester, Moths of the Limberlost, Laddie, Michael O'Halloran* and *Her Father's Daughter* (1921).

PORTER, Jane (1776-1850), an English novelist. She was born at Durham, spent much of her youth in Edinburgh, where she was educated, and lived later in London and at Esher in Surrey. Her publication of *Thaddeus of Warsaw* in 1803 brought her great renown, which was considerably increased by the appearance of *The Scottish Chiefs* in 1810. These works, though inferior to those of Sir Walter Scott, represent the best of the earliest historical romances in English. Another of her most noteworthy writings is *Sir Edward Seaward's Narrative of His Shipwreek,* an account of imagined incidents so realistically told as to have been received as authentic by some critics.

PORTER, William Sydney (1867-1910), a popular American author of short stories, who died almost at the beginning of a brilliant career. The reading public knew him as O. Henry, for under this name he wrote the humorous and realistic tales of the lives of everyday Americans so widely read and loved. Mark Twain was a world humorist; but Porter was essentially American. His clever use of the common street slang of the American city, his broad sympathy and his keen insight into the lives of the poor are best appreciated by American readers.

WILLIAM SYDNEY PORTER
His name is unknown to millions to whom "O. Henry" is a familiar term.

For the benefit of his health, for he was not a robust child, he was sent from his home in Greensboro, N. C., to Texas. There he attended school and worked on a ranch. He began his literary career as a reporter on the staff of the Houston *Post,* where his originality and wit quickly won him recognition. He then bought a paper known as the *Iconoclast,* which he published and edited as *The Rolling Stone,* but was not successful in this venture. Then followed a visit to the fascinating land of Central America, where he "knocked around," as he expressed it, long enough to imbibe a good deal of local color to be used later so effectively in the "O. Henry" tales. After his return to America he worked for a brief period in a Texas drug store (the source of more local color) and then moved to New Orleans to work seriously as a writer of short stories for the daily papers. Finally he settled down in New York, where he did his finest work. In that city he died.

In all, O. Henry wrote about 200 short stories, which have been collected under various titles. Among the best of these collections are *The Four Million, The Trimmed Lamp, The Voice of the City, Cabbages and Kings* and *Options.*

Consult Smith's *O. Henry Biography.*

PORT HOPE, a town in Ontario, the county town of Durham County. It is on the north shore of Lake Ontario, sixty-three miles by the shortest railway line east of Toronto. Cobourg is six and one-half miles east of Port Hope, and Belleville is fifty miles east. Port Hope is on three of the Canadian trunk lines, the Canadian Pacific, the Canadian Northern and the Grank Trunk railways, and is also a port of call for lake and Saint Lawrence River steamers. It is a popular resort for summer visitors, and is also an industrial center of importance, among its leading manufacturing establishments being iron-pipe works, flour and planing mills, tanneries, and canning, pottery and carriage factories. The Trinity College School for Boys is located at Port Hope. Population in 1911, 5,092; in 1921, 4,456.

PORT HURON, Mich., a port of entry and the county seat of Saint Clair County, is situated on the east coast of the state, at the southernmost point of Lake Huron. It is at the mouth of the Black River, which here flows into the Saint Clair River, and it is opposite Sarnia, Ont., with which it is connected by steam ferries and by a river tunnel under the

Saint Clair, 6,118 feet long. Detroit is fifty-seven miles southwest, and Saginaw is ninety miles northwest. The city has steamboat connections with lake ports and is served by the Grand Trunk and the Pere Marquette railroads. In 1920 the population was 25,944. The area of the city exceeds seven square miles.

Port Huron is a summer resort which entertains about 15,000 visitors annually. It has beaches, as well as Pine Grove, Lakeside, Gratiot and White Parks. Among many fine structures are the Federal building, city hall, United States customhouse, courthouse, Y. M. C. A. building, two Maccabee temples, convention hall, a Carnegie Library and a hospital.

Shipping and manufacturing are important industries, and the city controls a large trade with Canada. In 1915 the value of exports amounted to $36,855,761; imports were valued at $8,051,029. The chief manufactures are agricultural implements and machinery, milling machinery, and gas and gasoline engines. In the city are extensive shipbuilding works and the Grand Trunk car and locomotive shops.

The city was at first a settlement about Fort Gratiot; it was established in 1814 by the United States government, was organized in 1849 and became a city in 1857. In 1910 the commission form of government was adopted.

PORT JERVIS, N. Y., a summer resort in Orange County, eighty-eight miles northwest of New York City, at the junction of the New York, New Jersey and Pennsylvania state lines. Here the waters of the Delaware and Neversink rivers meet. Transportation is provided by the Erie and the New York, Ontario & Western railways. The place was named in honor of John Bloomfield Jervis, the engineer who began the construction of the Delaware and Hudson Canal (now abandoned), shortly after the first settlement was made in 1826. The village was incorporated in 1853, and it became a city in 1907. Its population was 9,564 in 1910; in 1920 it was 10,171, a gain of six per cent in ten years.

Besides being in itself a popular resort Port Jervis is the gateway to a district widely known for picturesque scenery and beautiful waterfalls, and the country near by is much frequented during the summer months. The city has a Federal building, a soldiers' monument, a public library and Saint Mary's Orphan Asylum. Silver-plating works, foundries and factories for making glass, silk and gloves are among the industrial plants. The big railroad shops of the Erie Railroad are also located here.

PORTLAND, Me., a seaport on Casco Bay and the county seat of Cumberland County, is the largest city in the state, and is also the leading industrial center. In 1910 the population was 58,571; in 1920 it was 69,272 (Federal census). Portland is situated on the southwest coast of the state, fifty miles southwest of Augusta, the state capital, and 108 miles northeast of Boston. It is on a peninsula between the Back Bay and Fore River, which separates it from the city of South Portland.

The large, deep harbor is one of the best on either coast of North America, and is protected by five strong forts—Preble, Levett, Lyon, McKinley and Williams—garrisoned by two thousand men. The picturesque stone castle, Old Fort Gorges, and Fort Scammel are no longer equipped. About the harbor are a large number of lighthouses. Direct steamship lines connect Portland with New York, Boston, and all coast points as far north as Saint John, New Brunswick. During the winter months, when the Saint Lawrence is frozen, Portland is the port for the transatlantic ocean traffic which terminates at Montreal and Quebec in summer. Portland is the terminus of the Boston & Maine, the Maine Central and the Grand Trunk railroads, and from the city five interurban lines radiate throughout a large territory.

Interesting Features. Portland is twenty-one and one-half square miles in area. The peninsula upon which it is situated is about three miles long, extending eastward into Casco Bay. Two great hills terminating in bluffs rise one at the east end and one at the west end of the peninsula. Munjoy Hill, the eastern elevation, is a residential section, and on the brow of the hill are the Eastern Promenade and Fort Allen Park. The view presented is a fine panorama of the harbor with its many islands. Bramhall Hill, also a residence section, has the Western Promenade, offering a good view of the White Mountains about seventy miles west. Deering Oaks, Lincoln and Fort Sumner parks, in addition to those already mentioned, are the largest areas of the city's park system. A statue of Thomas Brackett Reed, and one of Henry Wadsworth Longfellow, in Longfellow Square, both of whom were born in Portland, and the Soldiers' and Sailors' Memorial are interesting public monuments. One of the fine structures of the city is the $1,500,000 concrete bridge spanning the harbor to South Portland.

Buildings. Chief among the historic shrines is the birthplace of Longfellow. The property

was presented to the Maine Historical Society by the poet's sister, and near it stands the fine building of that organization. The city hall is a magnificent structure of Maine granite, built at a cost of $1,000,000. It contains one of the largest organs in the world; presented to the city by a native of Portland, Cyrus H. K. Curtis of Philadelphia. This fine instrument is played by a municipal organist. Other prominent buildings are the customhouse, the post office, the Federal and county courthouse, the exposition building, the Masonic Temple, Mechanics Hall, Sweat Memorial Art Building, a public library, the Episcopal and Roman Catholic cathedrals and other churches, and the home office building of the Union Mutual Life Insurance Company.

Institutions. The leading educational institutions are the Bowdoin College Medical School and Westbrook Seminary. Portland contains the state schools for the deaf and the blind, the United States Marine, Maine General, City and Children's hospitals, and the Maine Eye and Ear Infirmary.

Commerce and Industry. The grain elevators of Portland handle approximately 20,000,000 bushels each year. The principal exports are grain, lumber, cooperage and apples. The leading imports are coal, sulphur, pulpwood, salt and china clay. The city has extensive lumbering and fishing interests and is the center of a vast wholesale business. There were 308 factories in 1920; capital, $22,194,000.

History. Portland was founded in 1632 by two Englishmen, George Cleves and Richard Tucker. The early Indian name was Machigonne, but the place after settlement was known as Casco Neck and later as Falmouth. On the city seal is the inscription *Resurgam* (I shall rise again); it is significant of the four times when Portland suffered all but complete destruction. In 1676 it was almost demolished in an Indian raid, and it suffered the same fate at the hands of French and Indians in 1690. In 1775 it was bombarded by the British. It was incorporated in 1786 and became a city in 1832. In 1866 the last general calamity occurred in the form of a fire which destroyed property worth $10,000,000. Portland has had many noted citizens, among whom are Commodore Preble, Longfellow, Neal Dow, Thomas B. Reed and Lillian M. N. Stevens, who succeeded Frances Willard as president of the National W. C. T. U.

Consult Goold's *Portland in the Past;* Willis's *History of Portland.*

PORTLAND, Ore., the largest city of the state and the county seat of Multnomah County, is an important commercial and industrial city in the northwest corner of the state, fifty miles north of Salem, the state capital, and 183 miles south of Seattle. It is on the Willamette River, about twelve miles south of its junction with the Columbia River, and is approximately 100 miles by water from the Pacific Ocean. Ocean steamers sail regularly from Portland to San Francisco, and to ports of Puget Sound, Alaska and the Orient; river boats sail to ports of both the Willamette and Columbia rivers; on the Columbia, they go as far east as Lewiston, Idaho. Portland is entered by the Great Northern, the Northern Pacific, the Southern Pacific, the Chicago, Burlington & Quincy, the Union Pacific and the Chicago, Milwaukee & Saint Paul railroads. The population of the city is rapidly increasing; in 1910 it was 207,214; in 1920 it was 258,288, a gain of 25 per cent in ten years.

Situation and Parks. Portland occupies a beautiful site on fifty-one square miles of land which slopes gradually from both banks of the Willamette River. The surrounding mountains are covered with forests of firs, cedars and oaks. Snowy peaks, Mount Hood, Mount Rainier and others, are the dominating features of the landscape, and the environment of the city is noted for beautiful waterfalls, deep canyons and great pine forests. More than 650 acres are reserved for parking; the largest areas are Washington Park, covering forty acres, in which stand the fine statues *Sacagawea* (see Lewis and Clark Expedition for illustration) and *The Coming of the White Man;* Mount Tabor Park, 176 acres; Macleay, 130 acres; and Peninsula Park, which is known for its hundreds of varieties of roses and its famous sunken gardens. Portland is known as the *Rose City,* and its annual rose festival is a beautiful pageant.

Institutions and Buildings. Portland is the seat of Reed College, an institution with an endowment of $3,000,000, and there are also located here the University of Oregon Medical School, the College of Dentistry and Pharmacy, Columbia University, Hill Military Academy, and Allen Preparatory School. Numerous private schools supplement the public school system. Among more than fifteen public and private hospitals, the Good Samaritan and Saint Vincent's are most prominent.

The Federal buildings include the customhouse, built in 1902 at a cost of $960,000, and the post office and Federal court building,

erected in 1875 at a cost of $611,165. Other prominent structures are the courthouse, costing $1,500,000, a $600,000 city hall, an $800,000 public library, an auditorium, Chamber of Commerce building, union depot and the Industrial Exposition building. Several fine steel bridges span the Willamette River.

Industry. Exceptional water and rail transportation, timber, agricultural and mineral wealth, and a large tributary section providing a market for products have combined to make Portland an important commercial city. The wholesale and jobbing interests alone do a business amounting to $200,000,000 a year. In the fine harbor are three large municipal docks and a municipal boat landing, and within the city limits are twenty-eight miles of harbor frontage. The export trade of the port, consisting chiefly of grain, flour, lumber and salmon, is valued in some years at over $18,000,000. Portland is among the largest lumber-manufacturing cities in the world, with an annual output worth over $10,000,000. It ships vast amounts of grain, and is a large live-stock and meat-packing center. The principal products of manufacture are lumber and lumber products, flour, furniture, woolen goods, harness, saddlery and machinery. Quantities of fresh salmon and fruit are canned and shipped. The combined value of manufactured products exceeded $196,000,000 in 1920. There are ship- and boat-building yards and a dry dock which accommodates the largest vessels. Water power for manufacture is derived from the Willamette Falls at Oregon City, twelve miles southeast of Portland.

History. It is said that two New Englanders, Pettygrove and Lovejoy, tossed a coin to decide whether the name of the settlement, which they founded on the site in 1843, should be Boston or Portland. After 1850 the growth of the place was rapid, and in 1851 it received a city charter. A great fire occurred in 1873 and in 1894 much damage was caused by floods. The Lewis and Clark Exposition was held in Portland in 1905. The city adopted the commission plan of government in 1913; the municipality owns and operates its water system, obtaining an unlimited supply of purest water from a lake at the foot of Mount Hood. E.N.W.

Consult Gaston's *Portland, Oregon: Its History and Builders.*

PORTO ALEGRE, *pohr'too ah la'greh,* with a population, in 1915, of 130,227, is the capital of the Brazilian state of Rio Grande do Sul. It is located on the eastern bank of the Rio Guahyba, about 160 miles from the port of Rio Grande do Sul, and about 710 miles southwest of Rio de Janeiro. Porto Alegre is about 5,690 miles from New York and about 6,150 miles from London, by way of Rio de Janeiro. More than half the people are Germans, but there are a great many Italians. The city has broad, paved, and generally tree-shaded streets and a good water supply. The newer architecture has been influenced by Italian taste. Plaster, stone and brick are much employed in building, and tinted walls are common. The cathedral, government palace and hospital are among the most noted buildings. The former is an imposing structure.

The Germans began to settle here in 1825, and have led in building up the commercial importance of the place, which was first established in 1742 by Portuguese from the Azores. The state has large agricultural interests, producing much wheat and meat. The city, which is the commercial center of the state, manufactures cotton cloth and cotton goods, shoes, safes, stoves, paper, carriages, macaroni and various other products. Besides its name, which means *joyous port,* it boasts the title of *leal e valorosa* (loyal and brave).

PORT OF ENTRY. The officers of a vessel bringing merchandise from a foreign country may not put in to any port they choose and there unload their goods. Governments have designated certain points as *ports of entry,* and at these only may foreign goods be unloaded and released to domestic trade. At each of these ports of entry a customhouse has been established, through which all imports must pass, and the officers of any vessel putting in at a port without a customhouse and there unloading imports are guilty of smuggling. Since the principle of shipping in bond (see BOND, subhead *Other Meanings of the Word "Bond"*) has obtained so widely, ports of entry are not necessarily seaports.

PORT OF SPAIN, the capital of Trinidad, one of the British West India islands. It is situated on the western shore of the island, on the Gulf of Paria, which affords a safe harbor, though large ships have to anchor some distance from the shore. Of recent years it has become an important shipping point, not only for the products of Trinidad but for those of the rich Orinoco region, as well. It is a fine town, with wide, beautifully-shaded streets, an excellent botanical garden, two cathedrals and a well-managed street railway system. Population in 1911, 59,658.

PORTO RICO, *pohr'toh re'ko,* a beautiful and productive island of the West Indies, which became a possession of the United States in 1898, at the conclusion of the Spanish-American War. It lies about 1,000 miles southeast of Key West, Fla., and eighty miles directly east of the island of Haiti. Among the Greater Antilles—Cuba, Jamaica, Haiti and Porto Rico—it ranks fourth in size, but, with more than 300 persons to the square mile, is the most densely populated of the four. Having the general shape of a parallelogram, Porto Rico is about 100 miles from east to west and thirty miles from north to south; its area of 3,435 square miles is about one-third less than that of the state of Connecticut. If a few small islands along the coast, belonging to it geographically, are considered, the area is 3,606 square miles. No point on Porto Rico is more than eighteen miles from the sea.

The People and Cities. About one-third of the inhabitants are negroes and people of mixed negro and Spanish blood, the descendants of the Africans who were brought to the island as slaves. The majority of the whites are Spanish, but many American and European business men have recently acquired interests in the sugar and tobacco industries; the population has been also increased by not a little immigration. In 1910 the island had a population of 1,118,012. In 1920, according to the report of the United States Census Bureau, it had increased to 1,299,809. The population of the capital, San Juan, for the same year was 71,443. Next in size is the city of Ponce, with 41,912 inhabitants; three other places have more than 10,000; these are Mayaguez, with 19,124; Arecibo, with 10,039, and Caguas, with 12,-149. (These figures do not include populations of suburbs or outlying districts.) There are about sixty smaller towns on the island and about twelve villages. More than sixty-three per cent of the natives are engaged in agricultural pursuits and in fishing; about twenty-one per cent are in domestic and personal service; eight per cent are in manufacturing, and eight per cent in trade.

Surface and Drainage. A range of forest-covered hills, 2,000 to 3,000 feet high, stretches across the island from east to west, and slopes down on both sides to the level lowlands along the north and south coasts. These lands are the grazing places of the Porto Rican cattle. In the north the rivers are longer, and many lagoons border the shores, but on the southern coast severe droughts often occur, and artificial irrigation is necessary. Many rapid rivers rising in the interior hilly region furnish water power, and forty-seven of Porto Rico's thirteen hundred streams are of good size, although not navigable for any distance. The Bayamon, the Loiza, La Plata, the Manati and the Arecibo, flowing to the northern coast, the Jacaguas in the south and the Blanco in the west are among the most important.

Climate. As in most hilly, tropical countries, the temperature varies at different altitudes, but Porto Rico has the most pleasant and healthful climate of any of the West India islands. The intense heat of the lowlands is modified by the northeast trade winds, and the nights are generally cool. During the hottest weather the temperature is rarely more than 90°, and in the highlands during the cold weather the thermometer seldom falls below 60°; frosts or hailstorms, and of course, snow, are unknown in the island. During the so-called "hurricane months"—July, August and September—the winds are often severe. The central ridge of hills intercepts the northeast winds,

and the rainfall is greatest in the north section of the island.

Mineral Resources. The visitor in Porto Rico will notice that all of the public buildings are constructed of limestone, which is found abundantly on the island. Many of the homes of the better classes are built of stuccoed limestone, but the majority are built of reinforced concrete. Clay used in making brick and earthenware, marble suitable for bridge piers and other constructional work, flagstone of good quality, and gypsum, employed in the manufacture of stucco and fertilizer, are other products of commercial value. On Mona Island, lying off the western coast, are beds of phosphate which are being worked. Salt deposits are found at several points on the main island. Though Porto Rico contains deposits of gold, silver, iron, copper, tin, mercury, platinum and other materials, the mining industry is still a matter of future enterprise.

Agriculture. All other industries in Porto Rico are secondary to those connected with the cultivation of the soil. The sugar, coffee and tobacco crops lead in amount and value, followed by fruit and nuts. A new irrigation system has greatly increased the output and export of sugar, and its producers within recent years have enjoyed unusual prosperity. Among the fruits, bananas, pineapples, plantains, oranges, grapefruit and cocoanuts are the most important exports, and among the vegetables, beans. The exports range from $100,000,000 to $108,000,000 in value each year. Nearly all of its trade is with the United States.

According to the United States Census Bureau, out of an area of 2,198,400 acres, 2,085,162 acres are in farm lands, and 2,022,404 acres are in improved land. There were 58,371 farms in 1920, valued at a total of over $151,285,000. The problem of the future is the equalization of farm holdings, as too much of the land is devoted to large sugar plantations. As a result, the people must rely for many of the necessities of life on importations, whereas the island should be self-supporting.

AN ISLAND OF NEW AMERICAN CITIZENS

Other Industries. The leading manufacturing industries of the island—the making of sugar and molasses, the manufacture of cigars and cigarettes and the cleaning and polishing of coffee—are directly connected with the chief branches of agriculture. Over 275,000,000 cigars and more than 350,000,000 cigarettes are manufactured a year by the Porto Rican tobacco houses. San Juan and Ponce are important tobacco centers, and Mayaguez and Caguas, of coffee cleaning and polishing. Minor industries are the distilling of liquors, the manufacture of hats and straw goods and of boots and shoes, and general shop construction and repairing. Business is showing rapid expansion. In 1920 there were in the island 619 manufacturing in-

dustries, capitalized at $84,151,310. The value of the products in that year of unusually high prices reached $85,506,834.

Transportation and Communication. There are about 1,000 miles of macadamized roads in Porto Rico, and old roads are being improved rapidly as a result of an annual government appropriation for the construction of highways. A railroad line encircling the island has long been planned, of which about 340 miles have been completed. This railroad has several short branches connecting with various centers of industry, and a new line across the island is being projected. In the wide streets of San Juan and Ponce one sees both oxcarts and electric cars. The residents of these cities enjoy the convenience of private telephones, and telegraphic communication is enjoyed throughout the island, there being about 1,850 miles of postal telegraph wire. The mail is distributed through 91 post offices. The Postoffice Department of the United States controls the railway mail and postal service.

Government and Religion. For about two years following the cession of the island to the United States, Porto Rico was under the jurisdiction of American military governors. The first act providing for civil government of the island was passed by Congress in 1900, and this law, with slight amendments, was in force until 1917. No provision, however, was made for making the Porto Ricans American citizens, and the law in this respect was not satisfactory.

In 1917 the Congress passed another act for the government of the Porto Ricans. According to this act Porto Ricans have full rights as citizens of the United States, though such citizenship is not obligatory. The former appointive executive council is replaced by a senate composed of nineteen members, chosen by ballot by the people of Porto Rico. The lower branch of the legislative department consists of a house of representatives, also elected by the people. The governor, who is appointed by the President, appoints the following heads of executive departments: commissioners of interior, agriculture and labor, and health. Commissioners of justice and of finance—the attorney-general and treasurer—and of education, are appointed by the President. The legislature elects a delegate to the United States Congress. The laws passed by the legislature are subject to the approval of Congress and the President. In July, 1917, the Porto Ricans, by a majority of over two to one, adopted prohibition for the island.

Outline and Questions on Porto Rico

I. Position and Size

(1) In West Indies group
(2) Distance from United States
(3) Area
  (a) Actual—3,435 square miles
  (b) Comparative

II. People

(1) Population
(2) Cities
(3) Races
(4) Occupations
(5) Religion
(6) Education

III. Geography of the Island

(1) Central range of hills
(2) Coastal lowlands
(3) Rivers
  (a) Importance of water power
(4) Climate

IV. Resources and Industries

(1) Minerals
(2) Agriculture
  (a) Primary importance
  (b) Chief crops
(3) Manufactures
  (a) Dependence on agriculture

V. Commerce and Transportation

(1) Value of trade
(2) Railroads
(3) Roads

VI. Government and History

(1) Governor appointed by President
(2) Legislative department
(3) History
  (a) Discovery
  (b) Settlement
  (c) Spanish rule
  (d) Spanish-American War and American dominion

Questions

What do the public buildings of Porto Rico indicate as to the mineral resources of the island?

Show that the manufactures of Porto Rico are directly dependent on its agriculture.

If the United States were as densely populated as is this island possession, how many inhabitants would it have?

Why is the rainfall heavier in the northern part of the island than in the south?

How does the value of the chief crop compare with the combined values of the three next most important crops?

How large a proportion of the land is improved farm land?

How does the law for the government of Porto Rico passed in 1917 differ from the earlier one under which the island was governed?

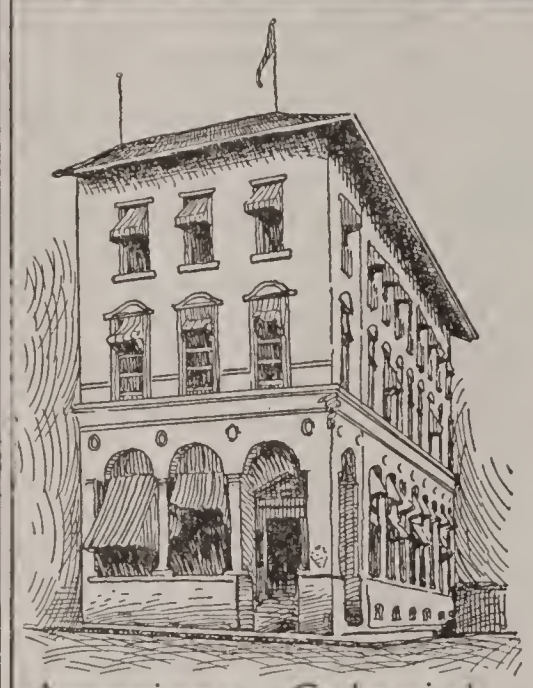
What language is spoken in the schools of Porto Rico?

How far from the sea is the farthest inland point?

What objections can be advanced to the continued growth of the sugar industry and the planting of greater areas to that profitable crop?

Mango

Guava


American Colonial Bank

Monument Marking Landing Place of Columbus in 1493

Y.W.C.A., San Juan.

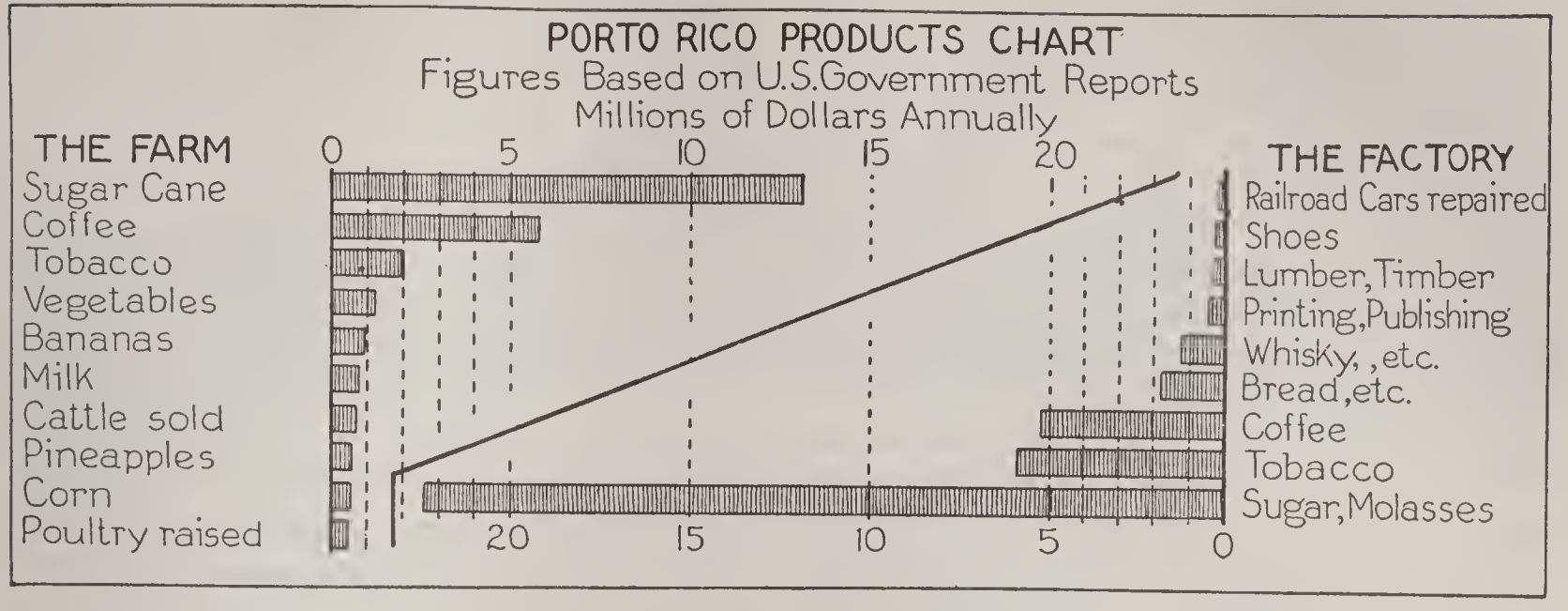
Normal Building University of Porto Rico

The majority of the inhabitants are of the Roman Catholic faith.

Education. Since 1899 education has made remarkable progress in Porto Rico. It has been made compulsory, and a system of elementary schools on the American plan is in operation. In 1922 there were over 3,700 public elementary schools and 12 complete high schools, besides continuation schools, night schools, kindergartens and private schools. Salaries of teachers are paid from the insular treasury, and they compare favorably with the salaries paid the average teachers in America. More than half of the rural teachers are men, and all are native Porto Ricans. At the University of Porto Rico, seven miles from San Juan, normal training courses are given, and there are the usual university departments. This institution has an enrolment of over 1,000. In San Juan there was recently erected a $100,000 Carnegie Library. The English language is spoken in the schools, and textbooks in English are used, though Spanish is taught throughout the course. Many of the children of the wealthy class are educated in the United States and in Europe.

History. In 1493 Porto Rico was visited by Columbus, and was named San Juan Bautista. In 1508 Ponce de Leon reached the island and two years later began its conquest. He founded the town of Caparro, now known as Puerto Viejo, and the city of San Juan, which in 1595 was sacked by Drake and three years later by the Duke of Cumberland. Under the rigorous Spanish rule the natives were soon swept away, and negroes were imported from Africa as slaves. In the seventeenth and eighteenth centuries the island was attacked by Dutch and English adventurers, but it remained in the possession of Spain. In 1820 and again in 1867 the Porto Ricans were unsuccessful in an attempt to declare their independence, and in 1870 the island was made a Spanish province. For eleven years it was allowed representation in the Spanish Parliament, being referred to by the home government as the "ever loyal and faithful isle." In 1873 forced labor was abolished and the last traces of slavery disappeared. Being alarmed by the revolt in Cuba in 1895, Spain instituted a reform in the government of Porto Rico, which was put into effect in 1897.

This government seemed to be working successfully when war was declared between Spain and the United States in 1898. Admiral Sampson in May bombarded San Juan, in July Ponce surrendered, and after a campaign which lasted but nineteen days the American army



occupied most of the island. Peace was signed on August 16, 1898, and the island was evacuated by the Spanish and ceded to the United States. In partial return for the cession of Porto Rico and the Philippine Islands the United States gave Spain $20,000,000. B.M.W.

Consult Wade's *Our Little Porto Rican Cousin;* Verrill's *Porto Rico, Past and Present;* Rowe's *The United States and Porto Rico.*

Related Subjects. The reader who is interested in Porto Rico is referred to the following articles in these volumes:

Banana	San Juan
Coffee	Sugar
Molasses	Tobacco
Pineapple	

PORT SAID, *pohrt sah eed',* an important seaport in Egypt, situated at the northern (Mediterranean) entrance of the Suez Canal. The town was founded in 1859 as a coaling station for ships passing through the canal, and for several years after its foundation it was a most unattractive place—hot, dirty, noisy, and with many undesirable inhabitants. In 1902, however, it became a center of cotton export, and two years later it benefited by the opening of a standard railway to Cairo, which put it in line for a share in the outside commerce of Egypt. New suburbs have been built, and social as well as economic conditions have greatly improved. In 1917 Port Said had a population of 91,090. It is the headquarters of the Governor-General for the Suez Canal. The harbor has been improved by the erection of huge piers of concrete, large docks and a lighthouse whose lamp sends out rays visible for over twenty miles.

PORTSMOUTH, *pohrts'muth,* a famous English naval station and arsenal, on the southwestern part of Portsea Island, which is situated between two inlets of the English Channel, about seventy-four miles southwest of London. Portsmouth station consists of four towns—Portsmouth, the headquarters of the garrison; Portsea, having the naval forces and dockyards; Landport, the home of the workmen; and Southsea, a residential town and fashionable summer resort. The entire community constitutes a municipal, county and parliamentary borough and covers 6,100 acres. In 1921 the population was 247,343.

The fortifications, wharfage, dry docks and harbor accommodations of Portsmouth are not surpassed elsewhere in Great Britain. The borough is a busy port, and in normal years there is a good trade in coal, timber, fruit and farm produce. Special features of interest are the Church of Saint Thomas à Becket, dating from the twelfth century; Victoria Park, with a monument to Admiral Charles Napier; and the recreation grounds of the naval forces and the militia. Portsmouth is famed as the birthplace of Charles Dickens, George Meredith and Walter Besant.

PORTSMOUTH, N. H., one of the county seats of Rockingham County and the only seaport of the state, is situated about three miles from the Atlantic coast, on the Piscataqua River and on the Maine state border. Dover is twelve miles northwest, Portland is fifty-seven miles northeast, and Boston is 57 miles southwest, by the Boston & Maine Railroad. An electric line communicates with towns south as far as Amesbury, and there is water transportation by ocean and river steamers. The population, largely American, was 11,269 in 1910; in 1920 it was 13,569, a 20 per cent gain. The area of the city is about fifteen square miles.

Portsmouth has many interesting relics of colonial days. Its delightful location, near picturesque islands in the harbor, makes it a desirable summer resort. It has three parks and

a number of fine colonial mansions, among which the Wentworth, Langdon and Whipple homes are of historic interest. The city has a customhouse and post office, some fine banks and school buildings, a museum and a library. Saint John's Church (Episcopal) is the oldest religious edifice, and was the place of worship for nearly all of the first settlers. Portsmouth also has a naval prison and a naval hospital. The fine harbor, which will admit the largest vessels, is the city's greatest commercial asset. The city is the most important distributing point for coal in the territory east of Boston. One of the largest button factories in the world is located in Portsmouth. In 1920 there were 39 factories, capitalized at $18,203,000. The quarrying of marble and granite is a thriving industry, and the United States navy yard, which is located on one of the islands in the harbor, employs about 2,000 men.

The place was settled in 1623, and was known as Strawberry Bank until 1653, when it was incorporated as a town, under its present name. It was within the limits of Massachusetts before New Hampshire was organized in 1679. Until 1807 it was the capital of New Hampshire; in 1849 it was chartered as a city. The treaty of peace at the close of the Russo-Japanese War was signed at Portsmouth in 1905, and the event is annually celebrated there. E.S.

PORTSMOUTH, Ohio, the county seat of Scioto County, is situated in the south-central part of the state, on the north bank of the Ohio River, at the mouth of the Scioto River and at the southern terminus of the Ohio Canal. Cincinnati is 107 miles northwest, and Columbus, the state capital is 100 miles north. Transportation is furnished by the Baltimore & Ohio Southwestern, the Chesapeake & Ohio and the Norfolk & Western railroads and by steamboat lines. In 1910 the population was 23,481; it was 33,011 in 1920 (Federal census). The area exceeds three square miles.

Portsmouth is a city of many attractive homes and is surrounded by a fine agricultural country. It has parks, a Federal building erected at a cost of $100,000, a Carnegie Library, a Masonic Temple, a city hospital and homes for aged women and for children. The chief industrial establishments are shoe, steel and fire-brick manufactories, furniture and veneer works, woodworking plants, and it has the terminal shops of the Norfolk & Western road. The place was settled in 1803 and became a city in 1814. In the Scioto Valley are remains of the ancient Mound Builders. R.E.T.

PORTSMOUTH, Va., the most important naval station in the United States, and with Norfolk forming one of the leading coaling stations in the world. The two cities also constitute a Federal customs district. Portsmouth is situated in the southeastern section of the state, opposite Norfolk on the Elizabeth River, an inlet of Chesapeake Bay. Richmond, the state capital, is about 100 miles northwest, by rail, and 116 miles by water. The port is the terminus for a number of transatlantic and coastwise steamship lines, and the Albemarle and Chesapeake and the Dismal Swamp canals provide communication with inland cities. Ferries connect with Norfolk, Newport News and Old Point Comfort, and railway transportation is provided by the Atlantic Coast Line, the Seaboard Air Line, the Chesapeake & Ohio and the New York, Philadelphia & Norfolk roads. The place was settled in 1752 and became a city in 1858; since 1915 it has been governed on the commission plan. In 1910 the population was 33,190; in 1920 it was 54,387.

The most prominent feature of Portsmouth is the United States navy yard, located in the southern part of the city. It has a naval training school, a naval magazine, a plant for the building of steel vessels and three large dry docks. The United States navy hospital, in the northern part of the city, is a little community in itself. It is situated in a park of eighty acres, which contains also the handsome residences and quarters of the attendants; the grounds, with their fine drives, walks and beautiful shrubbery, provide a recreation park for the city. The courthouse, post office, Y. M. C. A. building, Kings Daughters' Hospital, public library, armory and the Kirn, Commercial and Law buildings are noteworthy structures.

There are large wholesale houses and produce markets here. The surrounding territory is rich in agricultural products and coal. The commerce of the port of Norfolk-Portsmouth is chiefly in cotton, coal, lumber, black gum, vegetables, fruit, peanuts, oysters, grain and fertilizer; it is the greatest peanut market in the world, and is one of the leading shipping points in the United States for berries, especially strawberries. The immense coaling stations here annually handle more than 2,500,000 tons of coal. The oyster, fish and crab interests are also extensive. The manufacturing industries are represented by cotton, cottonseed oil, knitting and lumber mills, a fertilizer factory, a fiber plant and smelting works; the railway car shops of the Seaboard Air Line are here.

THE STORY OF PORTUGAL

PORTUGAL, *pohr'tu gal,* a small nation with a long history, now one of Europe's stable republics. It extends for 350 miles along the southwest coast of the Iberian peninsula, sharing with Spain the area of that corner of Europe. While it has no natural north and east boundaries, except rivers for short distances, and no marked differences from its Spanish neighbors in the origin and language of its people, its history alone gives it distinction as a nation. The area of Portugal is 35,490 square miles, nearly equal to that of Indiana, but in the republic live 5,957,985 people, double the population of the "Hoosier" state. Since there is but one province of the country which does not face the Atlantic, it is essentially a maritime nation, and unlike Spain, still retains large and important colonial possessions. Portugal derives its name from that of one of its chief seaports, Oporto, which was anciently called the *Port of Cale.*

The People. Phoenician, Carthaginian, Roman and Greek colonists and Gothic and Moorish invaders were the ancestors of the Portuguese of to-day. A short people, with dark hair and eyes, the Portuguese are not unlike the Spaniards in appearance, but they are strikingly different from their light-hearted, keener-witted neighbors in temperament. Although their dress is flauntingly gay, they are a serious, sober-minded and busy people, lacking the artistic and aesthetic temperament of the other southern nations of Europe.

The throngs of beggars, typical of most southern cities, are not numerous in Portugal; the people generally are industrious and dependable. The burdens are carried upon the heads of the women, who do much of the heavy labor. The colonies have brought many French, English and Dutch into Portugal, but emigration to other countries has steadily increased; in 1908 the number leaving the country was 40,056, while twelve years later it was 95,000.

Surface of the Country. The coast of Portugal presents scenes of striking contrast, rising from marshes and sand dunes in the extreme north to steep, rugged cliffs which lift abruptly from the sea at Setubal, farther south, then dropping again to sandy beaches, to rise to inaccessible cliffs at Cape Saint Vincent. There are ten prominent capes, and four good harbors in the bays of Figueira, Ereceira, Setubal and Sines. Not all of the bays and river mouths can be used as ports, because of reefs which make passage impossible except at flood tide. Even in the great harbor of Oporto, ships can pass the bar only at high tide.

LOCATION MAP

The interior is a succession of pine-covered hills and mountains which are continuations, west and southwest, of the mountain ranges of Spain. Between these lie the valleys, in which are the fertile wine districts of Portugal. The Cantabrian Pyrenees spread over the two northern provinces, their highest ranges, Serra do Gerez and Serra de Marão, being only 4,815 and 4,665 feet high, or about the height of the Adirondacks. The loftiest mountains in Portugal are the Serra da Estrella, in Beira, which rise to 6,540 feet. In the south the ranges are lower, having an elevation of only 2,000 or 3,000 feet. These mountain slopes, wooded with pine, furnish the timber of Portuguese commerce.

Many swift tributary streams flow into the three great rivers—the Douro in the north, the Tagus in the central part, and the Guadiana in the south. All of these rivers are navigable into Spain. As there are no inland lakes except the mountain lakes, the rivers are very important as commercial highways.

Climate and Rainfall. The climate of Portugal is notably equable and temperate; it is like that of the northern Pacific coast of the United States. The average temperature is 61°, with a difference of only 20° during the year. In the eighteenth century Portugal was a famous winter resort, but the lack of sanitation and improvements has turned the tide of tourists toward the Mediterranean shores in France and Italy. The heat in the valleys of the interior is often severe, but the surrounding mountains afford cool retreats.

The equable general temperature is caused by the sea winds and heavy rainfall, which though somewhat heavier in November, December and January, is not confined to any one season. In the winter the heavy rains cause the rivers to overflow, creating marshy districts where dense fogs prevail. Thunderstorms are very infrequent. The long summers and heavy rains develop luxuriant vegetation.

Mineral Resources. Although the mountains of Portugal contain great mineral wealth, these natural resources are largely undeveloped. There are lead mines at Coimbra; copper is mined at San Domingos, and antimony near Oporto, but most of the metal used is imported. The salt of Setubal is the chief mineral export.

Agriculture. The sunny hillsides and valleys are devoted chiefly to the cultivation of grapes. In a section twenty-seven miles long and five or six miles wide, about sixty miles from Oporto, sheltered from the sea and the northeast winds, are grown the sweet, black grapes from which is made port wine of the very best quality. Mulberries are plentiful, and the industrious vine grower of the north also cultivates the silkworm. The science of agriculture has been neglected until recent years, and the peasants do not allow experiments to be made to check the ravages of pests. There are some fields of maize, rye, wheat and hemp, and rice is cultivated in the lowlands, but the home production of cereals has not been sufficient to supply the country's needs. Onions, beans and sumac are raised; lemons, oranges, peaches and Elvas plums are abundant in the south, and the country's production of cork is next in importance to that of Spain. Portuguese olives are finer-flavored and cheaper than those of any other country, but Brazil alone, possibly because the two countries are of the same language, takes all that are exported. Two other important exports are timber and live stock. Portugal is one of the few countries never visited by the cattle plague, and the beef is of excellent quality.

Manufactures. Portugal has fallen behind most European countries in the development of manufacturing industries. The potteries of Aveiro and the lace manufactures are losing their former reputation. Oporto and Lisbon are the industrial centers, where paper, linen, wool, cotton, silk, buttons and pottery are manufactured. In the coast towns shipbuilding and fishing are the chief industries.

Transportation. Modern means of transportation and communication have prevailed in Portugal for some time. Fifteen hundred miles of railroads, the telegraph and the telephone connect all of the important towns. One may reach Spanish markets by railroad from any of the chief cities. Al-

though the picturesque ox teams are still seen in rural districts and small towns, the automobile and motor trucks are the modern city conveyances. The large rivers, dotted with the bright-hued sails of the small boats of the vine growers, are the chief commercial highways to the seaports. Portugal's foreign trade with Great Britain, Germany, Brazil and the United States is largely carried in English ships.

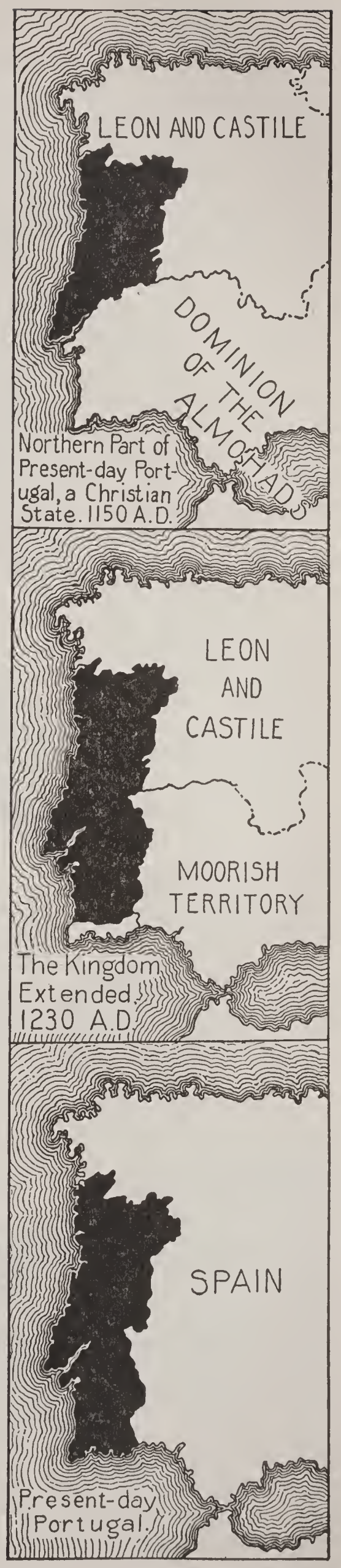
Religion, Language and Literature. Until 1910, when the republic was established, Roman Catholicism was the state religion of Portugal. The Church has now been separated from the state, and all forms of worship are permitted. Although the Roman Catholics of Portugal were never as zealous as those of Spain and their religion is less conspicuous, they are nevertheless incensed with the laws regarding the Church which have been passed by the republic. There is no affectation of the splendor and mystery of the Spanish churches, and no constant celebration of mass. There are 5,000,000 Roman Catholics and 40,000 other professed religionists in Portugal.

Cervantes said the Portuguese language was "Castilian without the bones." It is based on Latin, as is Spanish, but differs from the latter in accent and pronunciation. It lacks vigor and force, and has a soft, wailing cadence.

Portugal's literature is of a distinctly national character. Beginning with the songs of the troubadours (which see), celebrating the conquests over the barbarians and Moors, it reached its height in the work of Camoẽs, in the sixteenth century. The literary production of the twelfth and thirteenth centuries was chiefly theology, written in Latin; the legends of Arthur were popular in the fourteenth century, and introduced the epic into Portuguese literature; in the fifteenth century the influence of the Italian Renaissance was felt and lyrics and allegories were written. The nineteenth century produced Almeida Garrett, the poet, and Herculano, the historian, both of whom show the democratic spirit of the age and the influence of English and French romanticism. Guerra Junqueiro, born in 1850, is the most prominent modern poet of Portugal. He is a singer of revolution, a friend of the humble, and was the voice of the republican spirit which brought about Portugal's recent change of government.

In art, Portugal is not distinguished except for the Manueline architecture, a type belonging peculiarly to Portugal and named after King Manuel, "The Fortunate," who originated it. Many of the castles and cathedrals are examples of this style.

Education. Primary education is compulsory, and is rigidly enforced in the cities. As early as 1844 public instruction was regulated by law, and there were then seventeen secondary schools, having a high grade of teachers. In 1911 there were 7,120 elementary and thirty-two secondary schools, also normal training courses in the Universities at Lisbon, Coimbra and Oporto. Lisbon and Oporto each have polytechnic, medical and industrial schools; the Institute General of Agriculture, the Royal and Marine observatories and the Academy of Fine Arts are also at Lisbon. The state supports valuable public libraries, and there is a free library in Oporto. In spite of these educational opportunities 68.9 per cent of the people over ten years of age (1911) were unable to write.

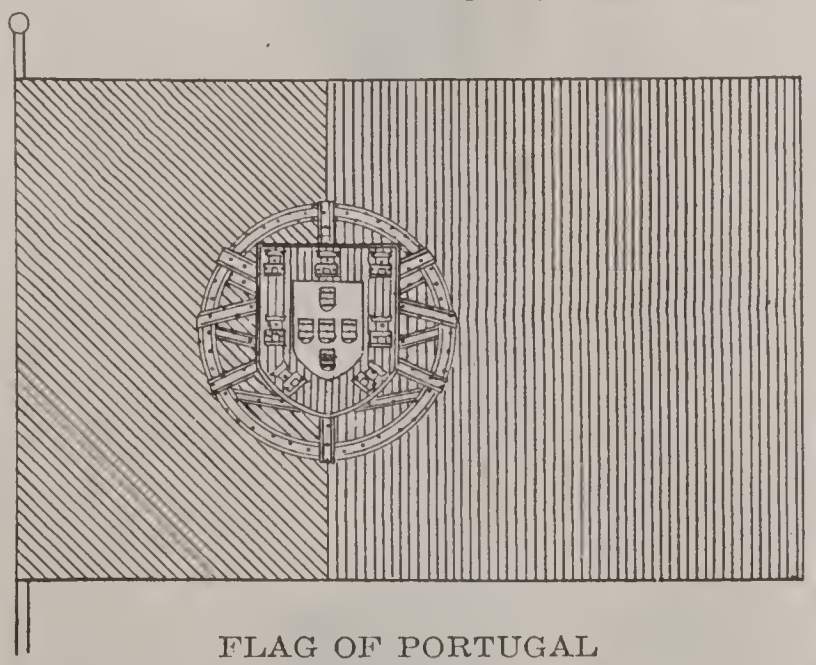


Government and History

Government. A republic was declared in Portugal on October 5, 1910. A provisional government was established which lasted until August 20, 1911, when a constitution was adopted. This provides for a legislative body of two chambers; the lower chamber, or National Council, consists of 164 members, elected directly by the people for a term of three years; the upper chamber has seventy-one members, elected by the municipal councils, one-half of the membership being renewable every three years. The President is elected by both chambers for one single term of four years, and he must be at least thirty-five years of age. He may not be present in the Chambers during debates. He appoints the Premier and seven ministers of state, all of whom are responsible to Parliament. The constitution may be revised every ten years.

The country is divided into 193 judicial districts, each having one court. There are courts of appeal at Lisbon and Oporto; the Supreme Court is at the capital.

Colonies. The estimated population of the colonies of Portugal is 9,144,310, about double the population of Portugal itself; their area is more than twenty-two times that of the republic. The Azores archipelago and the island of Madeira are considered a part of the republic, and are a part of the home government. The Cape Verde Islands, 300 miles from the west coast of Africa, peopled by the Portuguese and the negroid race, are of strategic and commercial importance. In Africa, Portuguese Guinea, a territory of 14,000 square miles in French Senegambia, inhabited by warlike natives, refugees and exiles, was important in the days of the slave trade. Other African possessions are Prince's and Saint Thomas's islands, which, though fertile, are not of great value because they are not improved and are very unhealthful; Angola on the west coast, and Mozambique in East Africa. The Asiatic colonies are largely in the Indian Archipelago; Damao, Diu, Goa, and Macao in China are important commercial centers for Portugal's far Eastern trade.



FLAG OF PORTUGAL

Vertical lines, red; slanting lines, green; strapwork and castles, gold; shields, blue, on white field.

Cities. Lisbon, the capital and largest city of Portugal, is famous as being the most beautifully-situated capital city of Europe, with the exception of Constantinople. It is notable also as having one of Europe's most attractive public squares, but this and its situation are its only beauties. Picturesque Oporto, the great seaport; Setubal, the warmest city of Portugal and notable for the export of salt; Faro, in the south, and Vianna, in the northernmost province, are Portugal's other principal cities.

Early History. The earliest historical colonists of Portugal came from Carthage and Phoenicia. Later Greek colonies were founded at the mouth of the Tagus, and during the Roman Empire Latin settlements were made. Some historians have identified Portugal as ancient Lusitania. In the fifth century the whole peninsula was overrun by the Visigoths, and in the eight century Portugal was conquered by the Moors. The rule of the Moorish Caliphs was wise, and the country prospered until the tenth century, when their power weakened. Centuries of fierce warfare between the Moors and Christians followed. Ferdinand the Great, in a series of battles, conquered the Moors, and his son, Alfonso IV of Spain, united the conquered provinces, giving the fief of Coimbra and Oporto to Henry of Burgundy; in 1095 he was made the first count of Portugal. Here Portuguese history begins.

The Line of Kings. Henry's son, Alfonso Henriques, was the first king of Portugal. He extended the kingdom by repeated victories over the Moors. His son, Sancho I, won the name of "The City Builder." During his reign and those of his successors, Alfonso II and Sancho II, the country was chiefly occupied in quarrels with the Papal power. Under Alfonso III (1248-1279), Portugal attained its European limits, Mohammedan warfare was concluded, and the constitutional history began.

From 1325 to 1337, under Denis, peaceful progress succeeded warfare; the first commercial

A Country Home in Southern Portugal

treaties with England were made; the navy was founded and schools were established. During the rule of the succeeding kings, Alfonso IV and Pedro I, the court had grown powerful and corrupt, and when Ferdinand came to the throne in 1367 the monarchy had reached a crisis, but he overcame internal difficulties and spent the sixteen years of his reign in war with Spain.

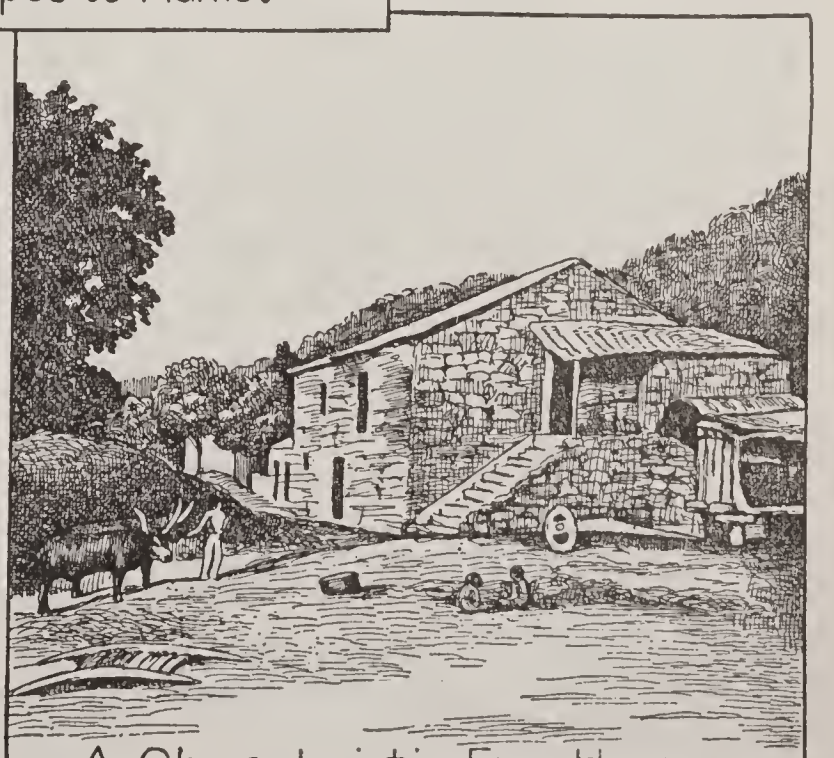
Expansion by Exploration. At his death, the cortez chose John I as king. His reign, with those of his three successors, Edward, Alfonso V and John II, is noteworthy for great explorations into the New World, with South America as the main objective. Under the patronage of Prince Henry the Navigator, Madeira and Porto Santo were rediscovered in 1418; during the years from 1433 to 1455 Baldaya, Tristam, Dias and Cadamosto explored the western coast of Africa; in 1462, the Cape Verde Islands were discovered and colonized; Gomez found the Gold Coast in Africa in 1469; Dias sailed around the Cape of Good Hope in 1486; a few years later Vasco da Gama found the Cape route to India, and Brazil was added to Portugal's possessions.

A "glorious age" followed under Manuel "the Fortunate" (1495-1554), but this age of luxury, absolutism and adventure was followed by a rapid decline during the reign of John III. The Inquisition stamped out the revival spirit; the Jews, who possessed the wealth of Portugal, were expelled; prestige was lost in India and Africa, and the kingdom was weakened at home by increased emigration. In 1580, Phillip II of Spain became King of Portugal. During the period of Spanish rule, the English, Dutch and French attacked the Portuguese colonies, and the Spanish held the lands and offices at home. This condition had lasted sixty years when the Duke of Braganza expelled the Spanish, and was crowned king as John IV, the first king of the house of Braganza.

During the reigns of Alfonso VI, Pedro II and John V which ensued, Portugal's foreign relations, especially those with England, were strengthened. In 1703, the Menthen Treaty, between Portugal and England, was signed. This treaty established Portugal's wine trade, and by admitting English manufactured goods free it caused the decline of Portugal's manufacturing industry. The reign of Joseph I (1750-1777) was one of much-needed reform and progress, but at this time occurred the depressing incident of the great earthquake at Lisbon in which 40,000 perished.

Carrying Grapes to Market

At the time of the French Revolution, Por-



A Characteristic Farm House in Northern Portugal

Outline and Questions on Portugal

I. Position and Size

(1) Latitude, 37° to 42° north
(2) Longitude, 6° 15′ to 9° 30′ west
(3) Part of Iberian peninsula
(4) Area
  (a) Actual, 35,490 square miles
  (b) Comparative

II. Geography

(1) Coast line
  (a) Varied character
  (b) Length, nearly 500 miles
(2) Surface features
  (a) Mountains
  (b) Fertile valleys
(3) Rivers
(4) Climate

III. Industries and Commerce

(1) Limited mining operations
(2) Agriculture
  (a) Vine growing
  (b) Other phases
(3) Manufacturing
(4) Transportation
(5) Commerce

IV. The People and Their Condition

(1) Population
(2) Resemblances to Spaniards
(3) Absence of beggars
(4) Language and literature
(5) Religion
(6) Education
(7) Government
  (a) Republican in form
  (b) Departments
  (c) Colonies

V. History

(1) Earliest years
(2) The glorious age of discovery
(3) The decline
(4) Relations to other countries
(5) Revolution and establishment of republic
(6) The War of the Nations

Questions

Why did Portugal lose favor as a winter resort?

If Portugal's colonies were as thickly populated as the mother country, what would their combined population be?

What state in the United States does Portugal most closely resemble in size? How do the two compare in population?

How do the Portuguese differ from their Spanish neighbors?

Which has the higher mountain peak, Spain or Portugal?

What famous product is named for Portugal's chief seaport?

Why do we see no Portuguese olives on the market?

How do the people travel in the rural districts?

How did a great Spanish writer describe the Portuguese language?

For what is the warmest city in Portugal noted?

Name three famous Portuguese navigators and tell what they discovered?

What was the immediate cause of the revolution by which the republic was established?

tugal was again drawn into war, through its alliance with England. In 1807, French forces occupied Lisbon, and Junot set up a military government. England sent aid to Portugal under Arthur Wellesley, who routed the French at the battle of Vimeiro, in 1808. John VI, the former regent, who had fled to Brazil, returned and became king under a new constitution, adopted in 1820. After the death of John VI, a period of civil strife followed, and republican feeling was continually growing stronger. New constitutions were adopted and during the reign of Pedro V (1855-1861) there was a great revival of national spirit. Railroads, telegraphs and the school system were improved and extended. As a result of the plague in Lisbon in 1861, in which the king died, much-needed sanitary reforms were accomplished.

When Carlos I succeeded his father in 1861, more changes in the government were necessary. The public debt was enormous and was steadily increasing. Foreign legations were abolished, and monopolies were granted the government in an effort to reduce the debt. The kingdom faced bankruptcy. Serious uprisings and strikes aroused the country to protest against Franco, the Prime Minister, who had assumed a dictatorship. The crisis came when the king signed a decree by which any political offender could be transported to Africa. The next day, February 2, 1908, King Carlos and the crown prince were assassinated in the streets of Lisbon.

Manuel II, the second son of Carlos, tried to establish a truly representative government, but party struggles had progressed too far. The Republican party gained a large majority, causing the fall of the monarchy in October, 1910. The royal palace was shelled, and Manuel fled from Portugal, taking refuge in England, which thereafter was his home. In this revolution the whole death roll did not exceed a hundred persons.

A provisional government was established, and the present constitution was adopted one year later.

In the War of the Nations. Portugal early showed its sympathies in the War of the Nations, which convulsed Europe in the summer of 1914. By treaty with Great Britain it was bound to furnish 10,000 troops whenever that nation, in war, required it. Before the close of 1914 Portuguese troops attacked German colonies in Africa to safeguard its own possessions, but made no further hostile move until February, 1916, when it confiscated forty-four Ger-

man trading vessels which had interned in its harbors to secure safety from the English and French. Germany demanded their release; no attention was given to the ultimatum which followed, and on March 8 Germany formally declared war on the republic. Portugal was thus the thirteenth nation to enter the conflict. Including its reserve force, it counted itself able to muster about 800,000 men for the cause of the allies against the Germanic powers and Turkey, should they be needed. E.B.P.

Consult White's *A Century of Spain and Portugal;* Oldmeadow's *Portugal.*

Related Subjects. The reader who is interested in Portugal is referred to the following articles in these volumes:

CITIES

Lisbon — Oporto

COLONIES

Angola — Portuguese Guinea
Portuguese East Africa

ISLANDS

See list, with article ISLAND

LEADING PRODUCTS

Cork — Olive
Grape — Port Wine
Mulberry

UNCLASSIFIED

Henry the Navigator — Pyrenees
Moors — War of the Nations

PORTUGUESE, *pohr'tu gees,* **EAST AFRICA,** a colonial possession of Portugal, lying along the east coast of South Africa. The name *Mozambique,* formerly applied to the whole colony, is now restricted to its northeastern coast. It is divided into two sections by the Zambezi River, and is bounded on the north by German East Africa, on the south by Zululand and on the west by British Central Africa, Rhodesia and the Transvaal. Its eastern shores are washed by the Indian Ocean. It covers an area of 293,400 square miles, divided for administrative purposes into several districts, under the control of Portuguese officials known as *commandants.* These are all under the authority of the governor of the territory, who resides at Lourenço Marques, the capital.

Youth quickly fades into premature middle age under the hot African sun in this territory, and malaria is an enemy which is constantly fought by the inhabitants. The port of Beira, one of the most important towns and the headquarters of the Mozambique Company, a trading corporation, is protected from the encroachments of the ocean by a sea wall which gives the place the appearance of being fortified. Handsome public buildings and hotels have been built, and avenues of acacia trees and ornamental gardens beautify the port.

The natives of Portuguese East Africa are negroes. They live in huts made of straw and mud, in settlements fringed by banana trees. The women pound millet in rude wooden mortars or grind it into coarse flour between flat stones. They are a peaceful, civilized people, generally engaged in raising corn, tobacco, palm nuts and coffee. Pearl fishing is also a source of considerable profit. There are about 300 miles of railway in the colony. The principal towns are Mozambique, Quilimane, Sofala and Beira. The population is about 3,120,000.

PORTUGUESE GUINEA, *gin'i,* a Portuguese colony of 14,000 square miles in Northwest Africa, bounded by the Atlantic Ocean and by the French Senegambian territory. The Bissayos Islands, off the coast, form a part of the colony. The capital and port is Bulama, on an island of that name in the delta of the Rio Grande, or Comba. The colony runs eastward on both sides of the river, and consists of alluvial plains covered with tropical vegetation and forests. The chief products are rubber, ivory, hides, oilseed and wax. The government is administered by a Portuguese governor and council, appointed by the Lisbon government; a military force of 250 men is maintained, including about 150 natives. The total population is 820,000. The inhabitants are of many tribes, each maintaining its own customs, religion and language, and they seldom mix or intermarry. The Portuguese inhabitants consist of officials, soldiers and a few traders.

There was a long-standing dispute between England and Portugal concerning ownership of this colony. In 1870 the United States government was called upon to act as arbitrator between the two powers, and the matter was settled in favor of Portugal. Little progress has been made under Portuguese rule, for the authorities have never acquired the confidence of the natives.

The colony abounds in natural resources and with careful development would prove a very valuable possession. Rubber trees are abundant, and among other trees found are the oil and date palms, ebony, mahogany, calabash trees and acacia. Fruit trees are plentiful, including the papaw, with fruit nearly as large as ostrich eggs; banana, orange, citron, apple and mango. Wild animals are plentiful. The elephant and the hippopotamus are found in certain districts, panthers and wild boars roam

the jungle, and baboons and chimpanzees of great size inhabit the forests. The rivers are infested with crocodiles and sharks. Birds of beautiful plumage and of infinite variety, including the heron, marabou, parrot, partridge and woodcock, are plentiful.

The island of Bulama was discovered by Portuguese in 1446. In 1669 a post was established on the Rio Grande, and in 1752 the Portuguese laid formal claim to the territory, due to the facts of priority in discovery and settlement. Such trade as is carried on is now mostly in the hands of the French. F.ST.A.

PORT WINE, a strong, full-flavored, red, nonsparkling wine, made from grapes, and at first produced only in Southwestern Europe. It takes its name from its principal shipping place, Oporto, Portugal. The grapes are grown in the rocky gorges about sixty miles north of the town. The climate gives the fruit a peculiarly wild, strong flavor, and this characteristic is strengthened in the wine by the crude methods used in its manufacture. The grapes are trodden by foot for twenty-four hours; the juice is then fermented in open vessels and rather large amounts of brandy are added from time to time. It is then allowed to mature for at least four years.

Port wine has a large percentage of alcohol, and, while sometimes prescribed for convalescents, is likely to damage the tissues of the stomach when used regularly. A kind of wine known as domestic port is made with great success in California, about 30,000,000 gallons being produced annually in that state alone. Like most California wines, domestic port has a higher percentage of alcohol than the imported variety. See YEAST; BACTERIA AND BACTERIOLOGY.

POSEN, *po′ zen,* a former province of Eastern Prussia, in the German Empire until 1919, covering an area of 11,190 square miles. By terms of the treaty of peace in 1919 Posen was given to the new republic of Poland, for most of its people are Poles. Indeed, until 1793 it was a part of the old kingdom of Poland, and was taken by Prussia in one of the partitions of the country (see page 4723). The chief towns are Posen (the former capital), Gnesen, Bromberg, Hohensalza and Schneidemühl. In 1914, during the War of the Nations, this section of Prussia was invaded by the Russians. In 1910 the province had a population of 2,099,831, of whom nearly seventy per cent are Roman Catholics.

Posen, capital of the old province, is situated on the Warthe River, 150 miles east of Berlin. It is a well-defended place, as defense was until but recently understood, surrounded by two lines of strong forts. Posen is built with considerable regularity, with numerous squares from which radiate many wide streets. The buildings of greatest interest are the cathedral, dating from the eighteenth century; the town hall,

LOCATION OF POSEN

containing valuable archives; the Raczynski Palace, with its library, and a provincial museum of antiquities. The making of furniture and agricultural implements are important manufacturing enterprises, and there are numerous distilleries and flour mills. Population in 1919, 326,881.

POSTAGE AND POSTAGE STAMPS. Postage is the charge for conveying a letter or other piece of mail matter to its destination; postage stamps are the small printed labels which are pasted on the mail to show that the charge has been paid. So far as the name indicates, postage stamps may be issued by private individuals, by corporations or by governments, but the term is restricted to those issued by governments.

Rates of Postage. In the early days of postal service, the charges for delivering mail depended chiefly on the distance the courier had to travel. Later, when stage coaches were used, distance was still the chief factor, but to-day, in an age of steam and electricity, in nearly all parts of the world rates are based only on weight and character of mailable matter.

United States. Domestic rates of postage apply to all matter whose destination is within the United States or any of its possessions, Canada, Mexico, the Canal Zone, the republic of Panama or Shanghai (China), and also to any matter addressed to officers or men of the

United States navy on duty abroad, wherever they may be. Foreign rates apply to all other countries.

All mail matter is divided into four classes, each with special rates:

1. The first class includes letters, postal cards (issued by the government), "post cards" or private mailing cards, and any matter sealed or closed so that it cannot be inspected. On this class the domestic rate of postage is two cents for each ounce or fraction thereof; on local or "drop" letters, in towns or rural districts which have no free delivery system, the charge is one cent for each ounce or fraction. This lower rate applies only to letters mailed in the town of their destination. The domestic rate on postal cards and private mailing cards is one cent. The foreign rate is five cents for an ounce or fraction of an ounce for letters and two cents for postal cards. Letters for Great Britain and Ireland, Newfoundland and Germany may bear domestic postage, but all other classes of mail to those countries are charged foreign rates. Letters to Germany at the two-cent rate are carried only by steamers which deliver mail at German ports; letters at the five-cent rate are sent by the quickest route.

2. The second class includes printed newspapers and periodicals which are regularly issued at least four times a year, and are mailed by the publishers or news agents directly to subscribers or to other agents. By an act of August 24, 1912, the second class also includes publications of fraternal, benevolent, historical, scientific and other learned societies, educational institutions, trade unions and a few other organizations, provided these publications appear at stated intervals not less than four times a year. The rate on such mail matter was for years one cent for each pound or fraction thereof, but was raised to one and one-fourth cents in 1917 as a war revenue measure.

3. Third-class matter includes all other printed matter, circulars made by copying devices, proof sheets (but not books), and manuscripts when accompanied by proofs. The limit of weight in this class is four pounds.

4. The fourth class is now called parcel post, and includes all mailable matter not placed in one of the first three groups (see PARCEL POST). By special permit to large business houses the postage on both third-class and fourth-class mail may be paid in cash, and the mail sent out without stamps attached, but bearing a printed label certifying to payment. At least 2,000 identical pieces must be mailed at one time to secure this privilege.

Foreign postage on printed matter, on commercial papers (including deeds, invoices, bill of lading, etc.), and on merchandise is one cent for two ounces. The first three classes of mail may be registered for a fee of ten cents, and may also be sent by special delivery for ten cents extra fee.

Canada. The rate for letters posted in the Dominion, and addressed to any place within its limits, Great Britain and Ireland, British possessions, Mexico or the United States, is two cents an ounce or fraction thereof. Post cards addressed to a Canadian, Mexican or United States point are charged at the rate of one cent each; to British and foreign points, two cents. Letters must be at least partially prepaid; double the deficiency in postage is charged when an underpaid letter is delivered. If no stamps are attached to first class mail it is sent to the dead-letter office.

Newspapers and other periodicals published in Canada not less than once a month and addressed to subscribers in the Dominion, Mexico, Great Britain and Ireland, or any British possession, bear postage at the rate of one-fourth of a cent per pound. However, publications which appear not oftener than once a week and not less frequently than once a month may be sent free to subscribers and dealers within a radius of forty miles from the office of publication or from any post office, provided that the post office chosen is not more than forty miles from the office of publication. The rate on books to be delivered in any country of the Postal Union is one cent for two ounces, which is also the rate for other printed matter and for samples of merchandise.

Rates in Other Countries. The postage rates in all countries which are members of the International Postal Union are practically identical. For example, the domestic letter rate in Great Britain and Ireland is one penny; in Germany, ten pfennig; in France, ten centimes; in Mexico, twenty centavos; in Italy, ten centesemi; in Norway, ten öre; these rates are all the nearest equivalent of the Canadian and United States rates of two cents. The rate on foreign postage is everywhere the equivalent of five cents.

Postage Stamps. Strictly and correctly used, the term *postage stamps* includes only those stamps which are used for the prepayment of postage. Other classes, such as postage due, official revenue and newspaper stamps are not postage stamps, although they are commonly grouped under that title. A *postage due* stamp, affixed by the postmaster, is a convenient way of indicating that the prepaid postage is insufficient. In the United States, in fact, postage due stamps are used only on domestic mail; letters and packages arriving from foreign countries are merely stamped "Due, five cents" or whatever the amount may be.

All countries which belong to the International Postal Union use a fixed scheme of col-

ors for stamps which are equivalent in value to the one-cent, two-cent and five-cent United States or Canadian stamp. These values are the ones chiefly used for domestic and foreign postage. The one-cent color is green, the two-cent is pink, and the five-cent is blue. These colors are permanently adopted, and whenever the mail clerk sees a blue stamp, even if the words on it are in a language he cannot read, he knows that five cents or the equivalent have been paid.

Pictures of stamps which are in current use cannot be printed in a general publication, hence this general article cannot be illustrated.

Stamp Collecting. The collection and study of stamps is sometimes considered as merely a hobby. Far from being valueless, it is a pastime of great interest and of educational value. Even the youngest child who begins a collection learns the names of the different countries of the world. If he knows nothing more about them than their names his natural curiosity will soon lead him to further inquiry. He also learns the standard of coinage from the values on the face of the stamp. If, as in Great Britain and the British colonies, the head of a ruler appears on the stamp he will soon learn, in some way or other, who the ruler is. Other stamps show local views, or bits of famous scenery, native animals and plants, characteristic devices in heraldry or arabesques, all of which the child or adult assimilates, perhaps unconsciously. See HERALDRY.

Besides learning much geography, the stamp collector cannot help but learn something of history. For example, if he turns to France, he will find that some stamps bear the legend *Empire Français,* and some *Republique Française.* The question naturally arises, When was France an empire, and when did it become a republic? Again, the stamp collector will wonder what the Roman states were, and why they no longer issue stamps, and why Italy's first issue of stamps was in 1851.

Most collectors begin their study with general collections, made up of all the stamps of all the countries they can obtain. Later, certain kinds of stamps or certain countries appeal more strongly, and the collector begins to specialize. He may confine his attention to a group, such as the states which make up the German Empire, or Great Britain and British colonies, or he may gradually narrow down the field to a single country.

Rare Stamps and Great Collections. The rarity of a stamp is determined not by its age, but by its scarcity. There are literally thousands of stamps which can be purchased for a few cents apiece. Nearly all dealers prepare assortments of stamps ranging in quantity from two to 4,000 or 5,000, and in price from five cents to $100. The larger assortments are good collections in themselves; if the purchaser can afford to add to them, they form an excellent basis for a large general collection. It has been estimated that the governments of the world have issued 25,000 different stamps.

The rarest of all stamps is the one-cent, issue of 1856, British Guiana, of which only one copy is known to exist; this specimen is in a private collection in Paris, probably the greatest collection in the world. Next in value, though not in scarcity, are the one-penny and two-penny Mauritius of the issue of 1847, a pair of which is worth about $5,000. Only fourteen copies of the one-penny and twelve of the two-penny are known to exist. Single specimens have been sold for $1,500 to $3,000, depending on their condition. There are a number of stamps of which only ten or fewer specimens are known, but for some reason or other they are not as popular and do not bring as high prices as the early Mauritius.

Of the United States stamps the rarest are the provisional issues of Baltimore and of Boscawen, N. H. (only one copy of the latter is known); these stamps were issued by the local postmasters in 1845 and 1846, under authority of the United States government. Of the regular stamps issued by the government perhaps the rarest is the 90-cent of the 1851 issue. Canadian stamps, as a whole, do not bring high prices, the chief exceptions being the 12-penny stamps of 1851 and 1852, which are valued at $400 to $600, according to their condition. An almost complete collection of Canadian stamps can be formed for a comparatively small expenditure.

W.F.Z.

References. The bibliography of stamps and stamp collecting is vast. Every collector should own at least one of the standard catalogues issued by the leading dealers. Their cost is small, and they are of great help in teaching the beginner the value and identity of different varieties. Dealers and philatelic associations also publish stamp journals, which contain much interesting information. For specialists there are numberless works in limited fields; among the standard books only a few can be mentioned here: Calman and Collin's *A Catalogue for Advanced Collectors;* Luff's *The Postage Stamps of the United States;* Tiffany, Bogert and Rechert's *The Stamped Envelopes, Wrappers and Sheets of the United States;* Calman and Collin's *Catalogue of the Stamps, etc., of Mexico;* Wright and

Creeke's *The Adhesive Stamps of the British Isles;* Goodwin's *The Making of United States Stamps.*

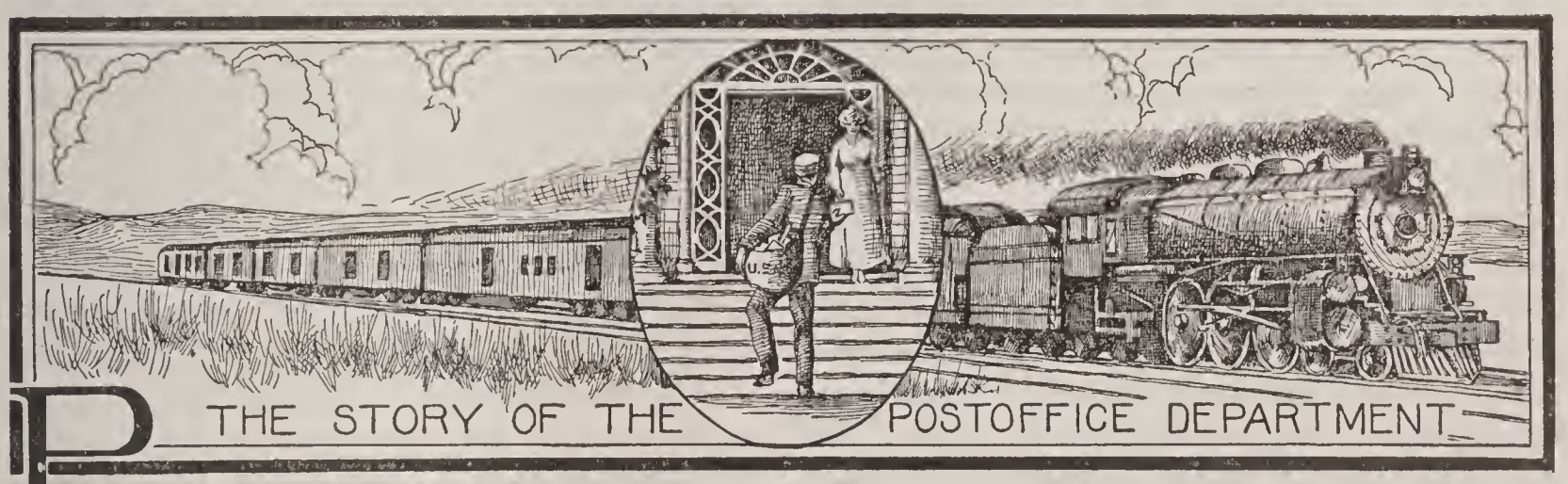
POSTAL SAVINGS BANKS. See SAVINGS BANKS.

POSTAL UNION, INTERNATIONAL, a union among nations for the purpose of establishing a common standard in postal matters, and for united action respecting the handling of mails. There were formerly a number of postal treaties, differing widely in detail concerning international mail, and in many cases the charges for transport across intervening states were excessive. The object of the union was to simplify treaties and cheapen transit.

The idea was borrowed from Germany; as early as 1850 the then independent Germanic states had formed such a union, and its benefits were apparent. The final details for this larger, international union were perfected at a postal congress at Berne, Switzerland, in 1874. It takes the form of an international treaty, signed by the representatives of the participating nations; it now includes all the nations of the world, with a few unimportant exceptions. In accordance with resolutions adopted, there is a congress composed of delegates from the signatory nations that meets every five years to consider postal matters; each nation has one vote. There is a tribunal to settle disputes, and permanent headquarters have been established at Berne, Switzerland, under the direction of the Swiss government. Uniform

POSTAL UNION MONUMENT
At Berne, Switzerland.

postage rates for the exchange of mail between all members of the union have been established. This represents but one phase of its activity, for every congress that meets has under consideration methods for improving the postal service between nations.



POSTOFFICE DEPARTMENT, a government department or institution for the conveyance and delivery of letters, papers and other matter legally mailable. The name *post* is of Latin origin, from the "stations" along the roads of the Roman Empire, where messengers or couriers were kept in readiness to relay dispatches. The postoffice as it is known today is in all essential features a modern institution. Originally it served only the government, particularly in times of war. The first regular postal service to be used by private individuals seems to have been established as early as the thirteenth century between the cities of the Hanseatic League.

In England a system of posts was maintained in the reign of Henry VIII, and was greatly developed under Elizabeth, James I and Charles I. About 1640 the rate of postage was from 2d. to 6d. for a single letter, according to distance, 8d. to Scotland and 9d. to Ireland, a penny (d.) equaling two cents in American or Canadian currency. Various changes in the rates and in the management were made until 1840, when the present system was established. The principal new features were the introduction of a charge by weight, a uniform rate for all distances, and prepayment. Prepayment was made easy by the use of newly-devised stamps, to be attached to the letter.

The postal service of Great Britain and Ireland is under the direction of the Postmaster-General, who is a member of the Privy Council and of the Cabinet. He is the only official in the department who resigns with the Cabinet, all other employees being under the civil service regulations. There are about 250,000 employees, divided among 25,000 post offices, and in normal times the total number of letters delivered each year averages 3,500,000,000, over seventy per head of population.

All other countries have modeled their systems to some extent on that of Great Britain. The Prussian postoffice was first established in 1646, and later other German states adopted similar plans. Until the beginning of the nineteenth century the office of Postmaster-General of the Empire was hereditary in the family of the counts of Thurn and Taxis, and all postal service, though nominally under government control, was practically a private enterprise. Later the north German states formed a postal union, which was superseded in 1871 by the present system, in which the states retain the management of their own postal service, except that they use the same stamps and together form an imperial postal district. Only Bavaria and Württemberg have separate issues of stamps. The German service has over 40,000 post offices, with 250,000 employees, and in normal times handles each year about 3,500,000,000 letters. The number of postcards used, over 2,000,000,000 a year, is more than are handled in any other country.

The French postoffice dates from the year 1464, and as early as 1643 included a parcel post. During the Franco-German War the Postoffice Department transmitted letters destined for Paris first by carrier pigeon and later by balloon. The French service to-day has about 15,000 post offices, handling each year approximately 3,500,000,000 pieces of mail matter, including 1,500,000,000 letters. Statistics for the Russian postal service are few, but it is estimated that the number of letters delivered is about the same as in France, although other classes of mail matter are much less important.

In the United States. This one postal system is greater than that of any European country. The number of letters delivered each year in the United States is from twelve to fifteen billion—greater than that of Great Britain, Germany, France and Russia combined. There are over 56,000 post offices and more than 300,000 employees, who handle one-third of the total postal business of all the civilized nations. The United States postal service handles from 750,000 to 850,000 letters every hour of the day and night, every day in the year. It issues and pays each day about 250,000 money orders, and registers 125,000 letters and parcels. The annual receipts average $300,000,000, or about $3 for each man, woman and child in the country; the expenditure for the service is always greater than the receipts. The average distance traveled by pieces of mail matter is 700 miles. The entire vast system is under the control of the Postoffice Department, one of the executive departments of the government, whose head, the Postmaster-General, is a member of the President's Cabinet.

Development. The earliest record of a postoffice in North America appears in the general court or assembly of Massachusetts in 1639, when the house of a certain Richard Fairbanks was

> —"appointed for all letters, which are brought from beyond the seas, or are sent thither, to be left with him, and he is to take care that they are to be delivered or sent according to direction."

Nearly twenty years later a postal service was established in Virginia, and in 1672 a monthly post between New York and Boston was put into operation. In 1691 a royal patent vested in one Thomas Neale the right to operate an intercolonial postal service, and from this event dates the real beginning of the postoffice in America. Service was begun in 1693, the post-riders traveling from Portsmouth, N. H., to several points in Virginia, taking many days for the journey. In 1707 the Crown purchased the good-will of this private organization, and until 1775 managed the colonial service as a branch of the general postoffice in London. The development of this service is intimately associated with Benjamin Franklin, who from 1753 to 1774 was deputy Postmaster-General for the colonies. Franklin was removed from office in the latter year because he had earned the government's displeasure by signing a petition for the removal of Governor Hutchinson of Massachusetts. The patriotic movement was then so far advanced, however, that the colonies organized an intercolonial service of their own.

During the Revolutionary War the service was more or less disorganized, and it was not until 1794 that the department was put again on a satisfactory basis. Since then the postoffice has developed in marvelous fashion; in

1789 there were seventy-five post offices; the greatest number in any year was 76,688 in 1900, but this number was reduced to 59,580 in 1910 by the establishment of rural routes.

The first great advance in the system came in 1847, when the government, following the lead of Great Britain, began to use the adhesive postage stamps. Stamped envelopes were first used in 1852, and three years later the registry system was introduced. The registry fee, formerly eight cents, is now ten cents, in addition to the usual postage. If the sender so requests, the receiver must sign a card called the return registry receipt, which is returned to the sender as evidence of delivery. All domestic mail matter except that sent by parcel post may be registered at any post office in the United States. The government will pay an indemnity of the actual value, not to exceed $50, for any piece of registered mail lost in transit.

Free Delivery. Previous to 1863 all mail had to be called for at the post office. In that year free delivery to street addresses in large cities was instituted on a small scale, and two years later the service was extended to all cities having a population of 50,000 or more. By degrees free delivery has been extended, until now about half the population of the country is thus served. It now exists in all cities having a population of 10,000 or more, as well as to smaller towns if they show annual receipts exceeding $10,000. The annual receipts range from about $5 at the very smallest offices to $25,000,000 and more in New York and Chicago. Free delivery is not confined to the cities and towns. It was first tried in country districts in 1896, and this branch of the service, known as rural delivery, has now grown to large proportions.

Special Delivery. Since 1885 there has been provision that letters and packages may be sent by special delivery. This means that when the mail arrives at the post office of its destination it is immediately given to a special messenger who carries it to the person addressed. Thus the letter or package may reach its journey's end several hours sooner than if it had been delivered by the regular letter carrier. The charge for this service is ten cents, paid by attaching to the letter a special delivery stamp or regular postage stamps to the value of ten cents, in addition to the ordinary postage. If regular postage stamps are used, *Special* or *Special Delivery* must be written on the address side of the envelope or wrapper. A similar service in Great Britain is called *express delivery.*

Money Orders. In 1864, a year after the free delivery system was instituted, the postoffice first assumed responsibility for the transmission of money. By this method the sender deposits the amount with the postmaster and receives in exchange an order on the postmaster of the place in which the money is to be paid. The money itself is not sent, as the paying postmaster simply pays the amount from his cash balance. The charge for the service is small, ranging from three cents for an order not over $2.50 to thirty cents for an order for $100, the maximum amount for one money order. A single purchaser, however, may buy a maximum of five orders for $100 each in a single day. The system was originally devised to provide a method whereby the families and friends of Federal soldiers at the front could send them small amounts of money. Its use proved so popular that it has since been at the command of all the people. All money orders are made payable at a designated post office, but if presented within thirty days of the date of issue, they may be cashed at any other money-order post office in the United States (but not in Alaska). If presented within a year of the date of issue they may be cashed either at the designated paying office or at the issuing office. If not presented for payment within five years a money order is void.

A similar system of international money orders is also in service. These money orders may be made payable in any foreign country which belongs to the International Postal Union. The fees are slightly larger than those for domestic money orders, ranging from ten cents for amounts up to $10, to $1 for amounts from $90 to $100. In most European countries the postoffice department will transmit money by telegraph for a slight fee in excess of the regular charge for a postal money order, but this plan has not been tried in the United States or Canada, although telegraph companies transmit sums in this manner.

Railway Postoffice. The backbone of the entire American system is the railway postoffice, founded by George B. Armstrong (1822-1871). Traveling post offices had been used in England before that time, but not until 1864 were steps taken to establish a regular system throughout the United States. The railroads were then induced to change the construction of their mail coaches so that letters and packages could be sorted on the train. This innovation has

made it possible to save several hours or more in the delivery of each letter, for when a train arrives at its destination all letters for points beyond are already sorted and placed in bags ready for the next outward-bound train. These traveling post offices have also been introduced on steamships, particularly those to and from foreign ports. The transportation of the mails costs the government over $50,000,000 a year, and the pay of the 18,000 clerks on the trains amounts to $20,000,000 more. Each clerk is familiar with the location of 5,000 to 20,000 post offices, and can tell instantly on what railroad each post office is situated, what junction points are passed to reach that office, and by what one of several possible routes a letter will most quickly reach its destination. The accuracy with which these clerks do their work is remarkable, the average error in classifying mail being only 1 in 12,000 pieces handled. One clerk established a record by sorting 17,000 cards at the rate of sixty a minute without making a mistake.

Classes of Post Offices. The post offices of the United States are divided into four classes, according to their annual receipts. In the first class are those whose receipts exceed $40,000 a year; the postmasters in this class receive salaries of $3,000 to $6,000. The second class includes post offices whose annual business amounts to from $8,000 to $40,000; these postmasters receive salaries of $2,000 to $2,900. Third-class offices have receipts from $1,900 to $8,000, and their postmasters receive from $1,000 to $1,900. Postmasters of these three classes are appointed by the President and are confirmed by the Senate. Their terms of office are nominally four years, but they are liable to removal for political reasons before the end of such term, for postmasterships have always been used to pay political debts.

There is a fourth class of post offices, with receipts below $1,900 a year. All fourth-class postmasters, except in Alaska and the island possessions, are now classified in the civil service, and are not subject to removal by the Postoffice Department. They receive no salaries, but are given a fixed percentage of the face value of postage stamps cancelled on letters mailed at their offices. When the commissions of a fourth-class postmaster amount to $1,000, the office is raised to the third class. Three-fourths of all the post offices in the United States are in the fourth class; these postmasters are appointed by the Postmaster-General, and not by the President.

In Canada. The Canadian postoffice is organized like that of the United States. The department handles about 700,000,000 pieces of mail yearly, has 15,000 post offices, and receives a net revenue of $13,000,000 to $15,000,000.

As in the United States, there is a free delivery system in the larger cities and towns, and in the country there is a rural mail delivery.

This rural service was inaugurated in 1908, and was greatly extended in 1912 and 1913. There are now about 2,000 rural mail routes. Canada also has a registry system, but the ordinary fee is only five cents, as compared with ten cents in the United States. If the sender, however, desires a receipt from the addressee an extra fee of five cents, or a total of ten cents, is charged. The payment of this fee is indicated by stamps on the envelope or wrapper. There is also a *special,* or *express, delivery,* in about fifty of the largest cities of the Dominion. A special-delivery stamp or regular postage stamps to the value of ten cents must be affixed to a letter or package for this service. Special-delivery mail matter may also be registered.

On money orders issued in the Dominion for payment in Canada, any of the British possessions in North or South America, or in Cuba or the United States and its possessions, the fees range from five to twenty-five cents, the minimum fee being for amounts up to $10 and the maximum for amounts from $60 to $100. On money orders to all other countries the fee varies from five cents to $1, according to the amount of the order. From seven to eight million money orders, valued at over $100,000,000, are issued in Canada each year; the value of orders issued in other countries and payable in Canada is about $10,000,000 a year. W.F.Z.

Consult Joyce's *History of the Post Office;* Hemmeon's *History of the British Post Office.*

Related Subjects. The reader is referred to the following articles in these volumes:

Cabinet
Dead-Letter Office
Parcel Post
Postage and Postage Stamps
Savings Banks, subhead *Postal Savings Bank*

POT'ASH, the commercial name of a compound of potassium and carbon dioxide. When early settlers cleared their land they leached the ashes obtained by burning the timber and boiled down the lye in large, open kettles, obtaining a white solid which they named *potash* because it was made from *ashes* in *pots.* In some rural communities wood ashes are still leached, and the lye obtained is used in the

manufacture of a crude soap. Potash occurs in all plants, and is found in large quantities in rocks. The salt beds at Stassfurt, Germany, are the chief source of the world's supply. America usually imported about 900,000 tons yearly, and when the War of the Nations cut off this supply in 1914, its preparation in the United States became necessary. It is obtained from feldspar by heating it to a high temperature with limestone and iron oxide. Potash is used for fertilizer, and in the manufacture of glass, gunpowder, soap and some chemicals.

POTASSIUM, *po tas'i um,* a soft, silvery-white metal, which when thrown upon water, bursts into flame. Potassium is one of the chemical elements (see CHEMISTRY, subhead *Elements*) and is never found free in nature, but it exists in combination with other substances in soils, in plants and in many rocks, about two and a half per cent of the earth's crust being potassium. The potassium of commerce is obtained from potassium salts found near Magdeburg, Germany. The salts are subjected to a powerful electric current, which frees the metal from its compounds (see ELECTROLYSIS).

Pure potassium is but little used outside of chemical laboratories. It is as soft as wax and lighter than water, from which it withdraws the oxygen so rapidly that the heat generated by the chemical action sets the hydrogen on fire. Hence we say that potassium burns on water. Because of its affinity for oxygen it has to be kept in naphtha.

Potassium is an element of plant food, and some of its compounds are used as fertilizer. A soil deficient in potassium will not produce good crops. Some potassium compounds are extensively used in the arts. The carbonate, or *potash,* and the nitrate, or *saltpeter,* are described under their titles. The hydroxide, or *caustic potash,* on exposure to the air or when dissolved in water changes to the carbonate. All solutions of the above-named compounds are strongly alkaline (see ALKALI). Potassium cyanide is very poisonous. It is used in photography and in dyeing. The sulphate commonly known as *plaster* is used as fertilizer. The bromide and iodide are used in medicine, and the chloride is employed in the manufacture of other potassium compounds.

POTATO, *po ta'to,* the most popular and widely-used vegetable in the world, belonging to the same family as the nightshade, the tobacco plant and the tomato. In every civilized country of the temperate zone the potato crop ranks next to the cereal crop. But this has not always been the case. Until Columbus discovered America and the early explorers had carried some of the curious plants of the New World back to the Old, potatoes were unknown in Europe. They were not even known in North America until after the middle of the sixteenth century, when they were first brought to Virginia from Peru. The name "Irish" is

HOW POTATOES APPEAR UNDERGROUND
At the left is shown the formation of the leaves.

applied to the plant because the introduction of potato culture into Ireland saved the people from the terrible famines that had often devastated the country, and not because they are native to the island.

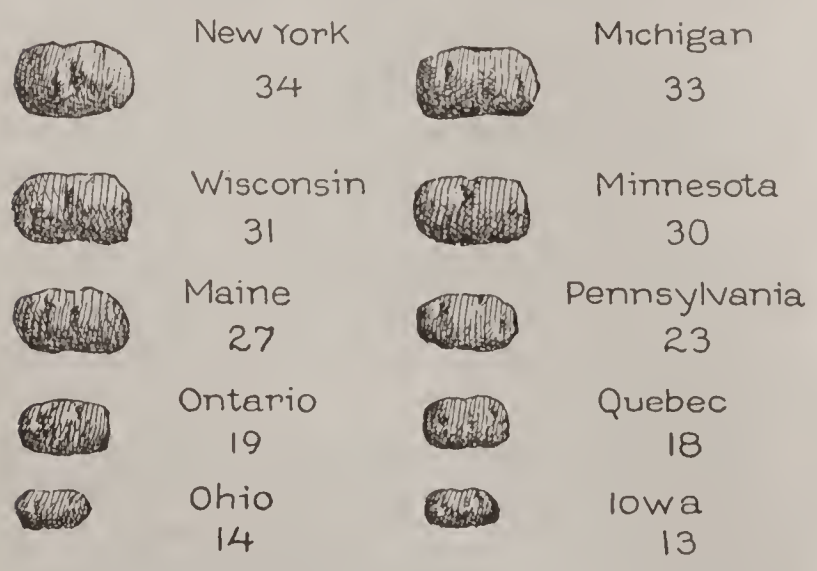
Description and Culture. The potato plant grows from one to three feet high, and bears white or purple flowers and a round, purplish fruit about as large as a gooseberry. The latter is the seedball of the plant. The edible part is not the root, but a tuber, or underground stem, and the "eyes" are stem buds. New plants may be grown from seeds or from old potatoes or pieces of potatoes containing "eyes," but there is a striking difference in the results obtained. An old potato used as seed will yield the same variety of tuber over again, while the tubers of plants grown from seeds will show considerable variation from the parent stock. The Burbank potato is the result of experimentation with seed planting.

Potatoes do best in well-drained, sandy loam, and they respond readily to enrichment of the soil. According to reports received from various experiment stations, best results are obtained when one-half a tuber is used as a seed piece, or "set." Under favorable conditions twenty bushels of seed (half-potatoes) to the acre will yield about 320 bushels per acre. The tubers are planted from a foot to sixteen inches apart in the row, and are covered with earth four inches deep. Frequent harrowing of the soil until the plants are above ground and thorough cultivation thereafter are necessary.

Harvesting may be done by hand or by means of mechanical diggers. Owners of large truck farms generally use machines drawn by horses, which harvest from four to six acres a day, at a cost of not more than two cents per bushel. The ordinary type of machine has a shovel point which works into the ground, lifts out the rows of potatoes and deposits them on an elevator. The latter shakes out the earth and leaves the tubers on the ground behind the machine. Various forms of plows are also used, but these do not accomplish the same results, as they leave too many potatoes undug. Often new potatoes are dug by hand labor, as their tender skins are easily injured by use of machinery.

Potatoes are subject to several forms of potato rot, or blight, which attack leaves, stems and tubers. One of the most effective measures for checking these diseases is spraying the young plants with Bordeaux mixture (see article Insecticides and Fungicides.) The Connecticut Experiment Station, after thirteen years of investigation, reported net gains of $15 per acre from the use of this mixture. Rotation of crops, care in selecting seed pieces, avoidance of infested soil and soaking seed tubers in a solution of corrosive sublimate are recommended as preventive measures. The chief insect enemy of the potato is described in the article Potato Bug.

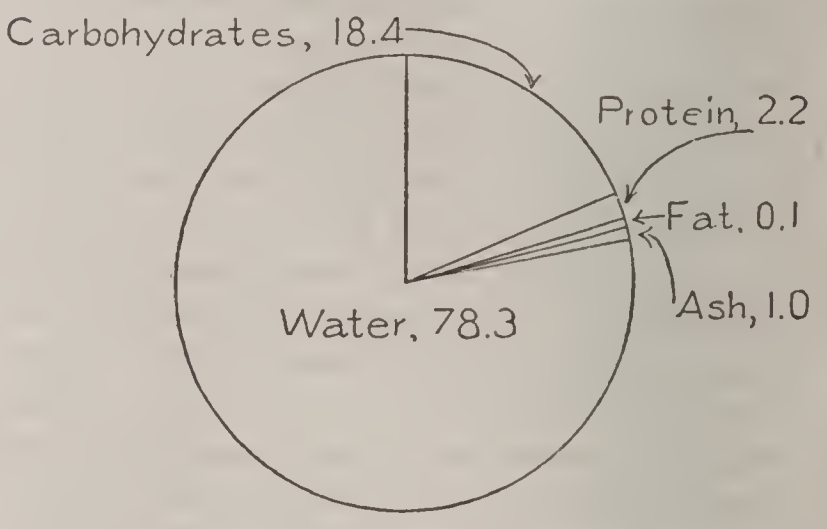
Production. The figures on potato production are so vast as to be almost meaningless,



PRODUCTION ILLUSTRATED

The figures represent the average crop during two years in the United States and Canada, in the principal potato-producing areas.

for it is impossible to form a conception of the six billion bushels which make up the world's average yearly crop. Germany is first, in normal years, with nearly two billion bushels, about thirty per cent of the world's total crop, and with an average yield per acre which is twice that of the United States. Russia ranks second, with an average yield of more than a billion bushels; Austria-Hungary is third, with from six hundred to seven hundred millions, about half what Russia produces; France, with a yield of from four hundred to five hundred million bushels, ranks fourth; the United States takes fifth place, with from three hundred to four hundred millions; and the United King-



FOOD VALUE OF BOILED POTATOES

As a heat producer the potato averages 440 calories per pound. This is slightly more than many other vegetables, and it averages well with most fish. The fuel value of eggs is twice as great.

dom is sixth, with from two hundred to three hundred million bushels. Canada, with a very high yield per acre—from 130 to 180 bushels—produces from sixty to eighty million bushels.

The value of the annual crop of the United States is estimated at about $200,000,000. The average yield per acre varies from ninety bushels to one hundred and nine. (The accompanying chart shows the average annual production of the leading states and provinces.) In quality of product and average yield per acre, Aroostook County, Maine, is the banner section of the United States. The retail price of potatoes varies from sixty-five cents to one dollar a bushel, in normal years, but a scarcity of supply never fails to raise the price of this ever-popular commodity. In 1917, as the result of a short crop and unsettled conditions of food distribution, potatoes in the United States cost the consumer in the neighborhood of a dollar a peck.

Food Value. Potatoes are an excellent food for supplying energy because of their high percentage of carbohydrates, chiefly starch. Another point in their favor is the fact that nine-tenths of their nutritive content can be readily digested. About one-seventh of the food used by the average American or Canadian family consists of potato in one form or another—

baked, boiled or fried. The results of an average analysis of boiled potatoes are shown in the accompanying diagram. The fuel value (see CALORIE) is 440 calories per pound. Served with meats, which lack carbohydrates but contain a good percentage of protein, potatoes help to make a well-balanced diet.

Other Uses. Though chiefly a table food, potatoes are also employed in the manufacture of starch, and are used to a certain extent as food for farm animals. In Germany, flour used in making bread is obtained from the plant, and alcohol is also manufactured from it and used as a substitute for petrol in running motors.

Sweet potatoes (which see) belong to another family.

Potato Clubs. Not a little of the success which has attended the boys' and girls' club movement has been due to the success of these organizations in potato culture. The growing of potatoes and corn attracts the boys and a few girls, while more girls are particularly interested in tomatoes. What the young people of America are accomplishing in their club work is told in the article BOYS' AND GIRLS' CLUBS, page 876. A.C.

Consult Gilbert's *The Potato;* Grubb and Guilford's *The Potato.*

Related Subjects. The reader is referred to the following articles in these volumes:

Burbank, Luther
Fertilizer
Food
Insecticides and Fungicides, subhead *Fungicides*
Potato Bug

POTATO BUG, or **COLORADO,** *kol o rah' doh,* **BEETLE,** a small, yellow insect with black-striped wings, the most destructive of the insect pests which attack the potato plant. When potatoes were first cultivated in the western part of the United States, this beetle left its original food plant, the sand bur, and traveled from field to field living on potato vines. In 1860 it had become troublesome in Nebraska; by 1875 it had spread to the Atlantic coast. To-day it is known and must be fought against wherever potatoes are grown.

The beetles emerge from the ground in the spring and lay their yellow eggs in clusters on the foliage; the red larvae (young), after they are hatched, feed on the tender leaves. After three weeks of ravenous eating they drop off, burrow into the ground and emerge full-grown about ten days later. From two to five broods may appear in one season. Frequent spraying of potato plants with Paris green or some similar poison, in solution, is the farmer's only effective protection against this troublesome enemy. See INSECTICIDES AND FUNGICIDES.

THE POTATO BUG
The young (at the left) are dark red; the adults have a fairly-hard outer covering, striped black and yellow.

Consult Riley's *Potato Pests;* Smith's *Manual of Economic Entomology.*

POTAWATOMI, *pot a wot' o mi,* a tribe of North American Indians belonging to the Algonquian family. Their name, meaning *fire makers,* has reference to their custom of making a tribal council fire. In the latter part of the seventeenth century they were living near Green Bay, Wis., but later they settled in the southern part of Michigan and in Illinois, eventually taking possession of a large territory in the vicinity of Lake Michigan, which included lands in Wisconsin, Michigan, Illinois and Indiana. In this region they had about fifty villages. The Potawatomi took part in the conspiracy of Pontiac (which see), and fought with the English in the Revolution and in the War of 1812. As civilization moved westward they were gradually driven beyond the Mississippi, and now are rather widely scattered. They number about 2,500, of whom nearly 900 are citizens of Oklahoma. Other groups are found in Kansas, Michigan, Wisconsin and Indiana. In Ontario there are about 150 of mixed Potawatomi and Ojibwa blood. See INDIANS, AMERICAN.

Consult Schoolcraft's *Indian Tribes of the United States.*

POTOMAC, *po to' mak,* an historic river of the United States, forming the boundary between Maryland and Virginia and Maryland and West Virginia. It is about 450 miles long, and is formed by two branches which rise in the Alleghany Mountains and unite fifteen miles southwest of Cumberland, Md. The

chief tributaries are the Monocacy, Shenandoah, Bull Run and Cacapon. Below Hancock, Md., the river flows southeastward through a picturesque gorge to Harper's Ferry, memorable as the scene of John Brown's raid. From Harper's Ferry to its mouth in Chesapeake Bay the Potomac passes Washington, D. C., the nation's capital, and Alexandria, Va. From the wharf at Alexandria may be seen the spire of Christ Church, of which Washington was vestryman. At Mount Vernon, the home of Washington, the river is two miles wide. The tide extends to Georgetown, 125 miles from its mouth, and the river is navigable for large vessels as far as the city of Washington. The famous phrase, "All quiet along the Potomac," is supposed to have originated with General McClellan during the War of Secession, in his reports to the government.

POTS'DAM, one of the residences of the former emperor of Germany, and a city of the Prussian province of Brandenburg, is situated on the Havel River, sixteen miles southwest of Berlin. In the immediate neighborhood are several royal palaces, of which the most interesting is the former residence of Frederick the Great. It stands in a beautiful park, called the Sans Souci. In the same park is the New Palace, the former residence of William II. This structure has over 200 rooms, one of the finest being the shell saloon, richly decorated with precious stones and souvenirs collected by the kaiser during his travels. Near by are the mausoleum, with a marble statue of Queen Louise, and the Temple of Friendship, erected in memory of the sister of Frederick the Great. Potsdam is a well-built city, having numerous fine squares and public gardens adorned with statues. Flower gardening, especially the cultivation of winter violets, is a lucrative industry. Population in 1910, 62,243.

POTTERY, *pot'er i.* One of the arts handed down through the centuries is that of making vessels of clay. To this art is applied the name *ceramic,* or *keramic,* a term derived from the Greek word *keramos,* meaning *pottery.* The products of ceramic art are known as pottery.

How Pottery Is Made. Clay containing the proper amount of moisture can easily be worked into a plastic state that will admit of its being fashioned into any shape desired. When dried, the clay becomes hard and firm. The simplest form of pottery can be made with but few tools, and primitive peoples have always attained a good degree of skill in making earthern vessels whenever the material has been at hand. Some of the finest examples of the skill of such people are found in the specimens of Indian pottery discovered in the pueblos in the southwestern part of the United States, and the descendants of those people to-day produce by skill of hand ware of rare beauty.

The first step in the making of pottery consists in the preparation of the material. Clay of various grades is used. Clay containing any appreciable amount of iron turns red when burned. This accounts for the red color of bricks and of the coarser varieties of earthenware, such as flowerpots and crocks. Some varieties turn reddish-brown and others cream color. But whatever the quality of the clay when it reaches the factory, it must be ground in water to a finely pulverized state. Before grinding, any hard objects such as small stones or pebbles are separated from it. During the grinding, proportions of fine sand, feldspar or flint may be added. The proportions and kind of these ingredients determine the sort of ware to be made.

Vessels are fashioned by hand, in molds, and by the use of both the hand and the mold. Only a few tools are employed. The potter takes the quantity of clay necessary for the vessel he is to make and throws it on the center of a horizontal disk called the *potter's wheel.* The wheel may be turned by a crank and pedal or by power. In either case the speed of the wheel is easily regulated to suit the convenience of the workman. With moist hands the workman forms the clay into the vessel as the wheel revolves. If a hollow vessel is desired he forms the clay into a cone, then presses down upon the apex with his thumbs and gradually works into the mass until in time by skill of hand he shapes the vessel. The finishing touches are put on with tools of wood and leather; then the vessel is placed in the drying room to harden. Revolving molds called *jiggers* are now used in all large manufactories, and they greatly increase the output. Plates and saucers are made by placing the mold for the upper side of the article on the wheel, then pressing the clay down on it, and then laying over the clay the mold that forms the bottom, the molds being so adjusted that a uniform thickness is secured for each plate.

Vases and many other hollow vessels of fine ware are now made in molds of plaster of Paris which are made in sections so they can be easily taken apart. This method is known as *casting.* The mold is filled with a thin mixture of water and clay and allowed to stand until a

POTTERY

From a mound in Arkansas

Zuni and Moki Indian specimens in Arizona

Greek Ewer

Greek Vase

Satsuma Ware

Chinese Porcelain

Chinese Pottery

layer of clay is deposited on the sides, when the mixture is poured out. The porous plaster of Paris absorbs the water, leaving the shell of clay. When this has sufficiently hardened the mold is taken apart. The most delicate wares are made by casting.

Firing. Clay that is hardened by drying will again absorb moisture. To prevent this it must be heated to a high temperature. After the pottery has hardened in the drying room it is placed in cylindrical earthen cases called *seggars,* which are stacked in a kiln one above the other. The firing lasts from thirty-six to forty-two hours, and the ware is usually heated to a white heat. The ware is allowed to cool slowly before it is removed from the kiln. The style of kiln, degree of heat and time required for firing vary for different kinds of ware. When taken from the kiln the articles are known as *biscuit.*

Glazing. This process consists in coating the ware with a substance which, when fired, will give a hard, glossy finish. Various substances are used, including lead oxide or litharge, powdered feldspar, flint, white clay, Paris white and other substances. The glaze is ground to a very fine powder and mixed with water. This mixture, known as *slip,* is a little thicker than milk. The articles are dipped in the slip and so handled by the workman that the glaze is evenly distributed over them. The water is absorbed by the ware or evaporated, leaving a thin coating of glaze which must be fused by heat; thus a second firing is necessary. The temperature in the glazing kiln is raised very slowly and the ware is allowed to cool slowly. The firing changes the glaze to a transparent gloss which brings out clearly any figures that may have been placed on the ware.

Color effects are produced by coloring the glaze and a variety of colors is produced by using glazes that have different colors. One part of the article may be dipped in one glaze and the other part in another. Sometimes the glaze is poured on the ware in an oven, and the flow stopped by heat, producing beautiful shading effects. Decorations are put on by hand either before or after glazing. In the latter case a third firing is necessary (see CHINA PAINTING). Glazing is the finishing process, and when the ware comes from the glazing kiln it is ready for the market.

Varieties of Pottery. There are many varieties, but all fall within three classes:

Earthenware. This includes all the coarser grades of pottery. It is usually thick and heavy and poorly glazed, or without glazing. Jugs, crocks and the heavier grades of ware used for cooking and table purposes are good examples. The pottery of prehistoric times and that now made by barbarous and partially civilized people belong to this class of ware.

Stoneware. This is a higher grade than earthenware and includes most of the tableware in general use. It is made of good material, is hard and light, well enameled and often beautifully decorated.

Porcelain, or China. This is the finest grade of pottery and likewise the most expensive. Chinaware can be easily distinguished from stoneware if specimens are held up to the light. The china is translucent; that is, some light will pass through it, while no light will pass through the stoneware (see PORCELAIN).

History. Pottery making is one of the oldest of arts, dating from prehistoric time, and discoveries of ancient pottery have enabled antiquarians of the present to judge the stage of civilization of the people by whom the articles were made. The ancient Egyptians attained a high degree of skill in making pottery, as did the Assyrians and Babylonians. The ancient Greeks claimed the invention of the potter's wheel, and they produced the most remarkable pottery of antiquity. The Romans obtained their knowledge of the art from the Greeks and the Etruscans. With the extension of the Roman Empire the art was carried to all parts of the civilized world.

The Chinese have for many centuries excelled in the manufacture of delicate ware, and the Japanese are nearly their equals in this regard, though much of the chinaware now on the market is made in Europe and America. France, Germany, Holland and England have each taken a prominent part in the development of modern pottery, and manufacture it on a large scale.

The manufacture of white ware was begun in America in 1685, and at the close of the Revolutionary War there were several potteries in operation. Other small works were opened from time to time, but no attempt to manufacture pottery on a large scale was made before 1825. In that year the Jersey Porcelain and Earthenware Company was incorporated and began the manufacture of pottery at Jersey City, N. J., on a much larger scale than had previously been attempted in America. Since the establishing of these works the American pottery industry has steadily increased, and the value of the yearly output is about $35,000,000. The largest potteries are in Cincinnati, Jersey City and on Long Island. W.F.R.

Consult Barber's *Pottery and Porcelain of the United States;* Solon's *Ceramic Literature.*

Related Subjects. The following articles in these volumes should be read in connection with this subject:

China Painting	Kaolin
Clay	Porcelain
Delft	Rookwood Pottery
Faïence	Wedgwood Ware

POTTS'TOWN, PA., an important manufacturing borough of Montgomery County, situated in the southeastern part of the state and on the Schuylkill River, eighteen miles southeast of Reading and forty miles northwest of Philadelphia. Transportation is provided by the Pennsylvania and the Philadelphia & Reading railways, and by electric lines. The town was organized in 1752, and was called Pottsgrove in honor of John Potts, the founder; in 1815 it was incorporated as a borough. Its present name was adopted in 1829. The population increased from 15,599 in 1910 to 17,431 in 1920, a gain of 12 per cent. It has an area of five square miles.

Pottstown is the commercial center for a fertile agricultural section which also possesses considerable mineral wealth. Large capital has been invested in the iron and steel interests; bridge works, rolling mills, furnaces, foundries, boiler and machine shops are the leading industrial establishments. Beside these, there are thriving manufactories of silk, hosiery and shirts. In addition to the public schools, which have a good library, the borough has Hill School, a nonsectarian school for boys. Three miles from Pottstown are some peculiar rocks, which when struck produce varying tones; they cover about one acre and are known as the *ringing rocks.*

POTTSVILLE, PA., the county seat of Schuylkill County, and an important shipping point for coal, situated on the Schuylkill River and on the Lehigh Valley, the Pennsylvania, the People's and the Philadelphia & Reading railroads and on interurban lines. It lies toward the southeastern part of the state, ninety-three miles northwest of Philadelphia and 150 miles west of New York City, and is picturesquely situated on hills that rise from the river. The area of the city is more than three square miles. The population in 1910 was 20,236; in 1920 it was 21,785.

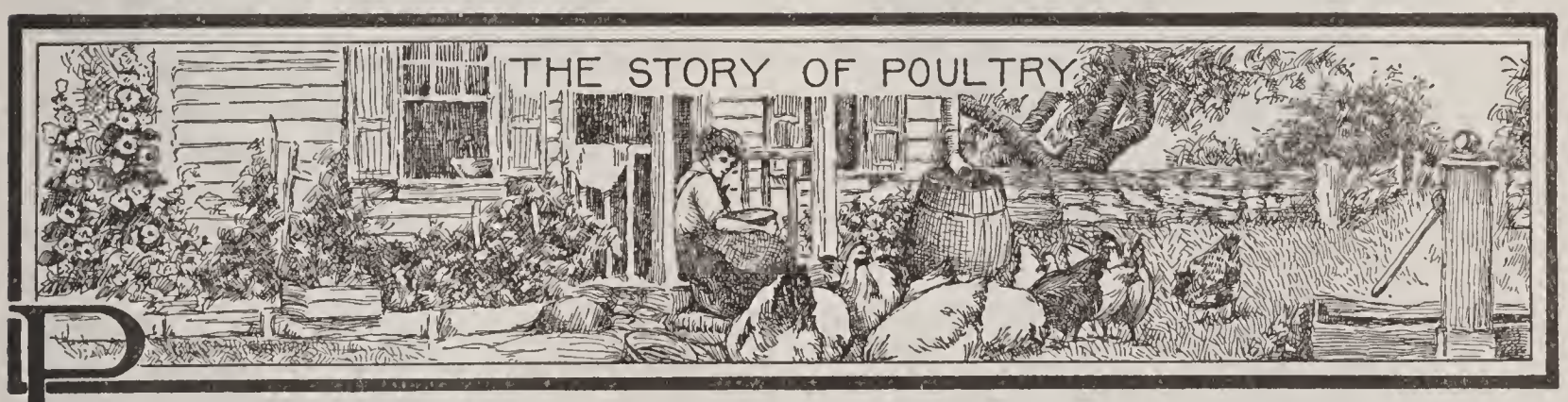
Anthracite coal, extensively mined in the Schuylkill region, is shipped from Pottsville, and in the city are shops of the Pennsylvania and the Philadelphia & Reading railroads, a large steel plant, knitting mills, textile and silk mills and manufactories of shirts and shoes, bolts and nuts and explosives. Pottsville has a fine courthouse, a public library, a public hospital, and an attractive park. Settled about 1800 and platted in 1816 by John Potts, the place was incorporated as a borough in 1828 and as a city in 1913. In 1914 the commission form of government was adopted. H.R.K.

POUGHKEEPSIE, *po kip'si,* N. Y., the county seat of Dutchess County and an educational center of special interest as the seat of Vassar College (which see). It is situated in the southeastern part of the state, seventy-five miles north of New York City, and the same distance south of Albany. Poughkeepsie is favorably located on the east bank of the Hudson River, has river-boat and ferry service (the latter connecting with the West Shore Railroad), and is on the Central New England and the New York Central railroads and on electric interurban lines. The area of the city is about three square miles. In 1910 the population was 27,936; in 1920 it was 35,000.

Built partly upon a plateau and partly upon sloping land, Poughkeepsie commands a fine view of the Hudson River. The city takes its name from an Indian word meaning *safe harbor.* Here is held the annual intercollegiate regatta for American colleges, Harvard and Yale excepted. The fine campus of Vassar College is east of the city. The city also has Glen Eden Seminary, Putnam Hall, Adriance Memorial Library, the Vassar Brothers' and Saint Francis hospitals, sanitariums, and homes for aged people and orphans. The Hudson River State Hospital is two miles north. Buildings of note are Columbus Institute (convention hall), the state armory, a $350,000 high school, the Amrita Club and the Y. M. C. A. building. The city has attractive parks and squares, and fine residence districts.

The output of Poughkeepsie's industries is sometimes more than $12,000,000 a year. The principal articles of manufacture are farm machinery, plows, horseshoes, cream separators, automobiles, trousers, cough drops, candies, buttons and tobacco products.

Poughkeepsie was settled by the Dutch in 1698. It was a military base for the American army during the War of Independence, and as the meeting place of the state legislature during the war it was then the state capital. The Federal Constitution was ratified here by the state convention under the leadership of Alexander Hamilton in 1788. Poughkeepsie was incorporated as a village in 1799 and became a city in 1854. W.H.F.



POULTRY. In a broad sense, the term poultry is applied not only to the common barnyard fowls—the cock and the hen—but to ducks, geese, turkeys, guinea fowls and a few other domesticated birds. The rearing of the common fowl, however, has reached a place of such importance that *poultry raising* is now practically synonymous with *chicken raising.* Probably no branch of farm work has aroused greater interest in recent years than the poultry industry. It has attracted many because it affords an opportunity for an active out-of-door life, and others have taken it up because the great and increasing demand for poultry products, and the high prices obtained for them seem to promise good profits from a moderate investment. The man who understands the poultry business can make more money, in proportion to the capital invested, than one who raises wheat, but everyone who undertakes to raise chickens must be prepared to work hard and perseveringly, to accept cheerfully many disappointments and failures, be content with small returns at first, and be willing to learn.

How Poultry Is Classified. A standard method of classification divides chickens into *classes, breeds* and *varieties,* with reference to their

place of origin, size and shape, and color, respectively. The following table includes the most important fowls of economic value:

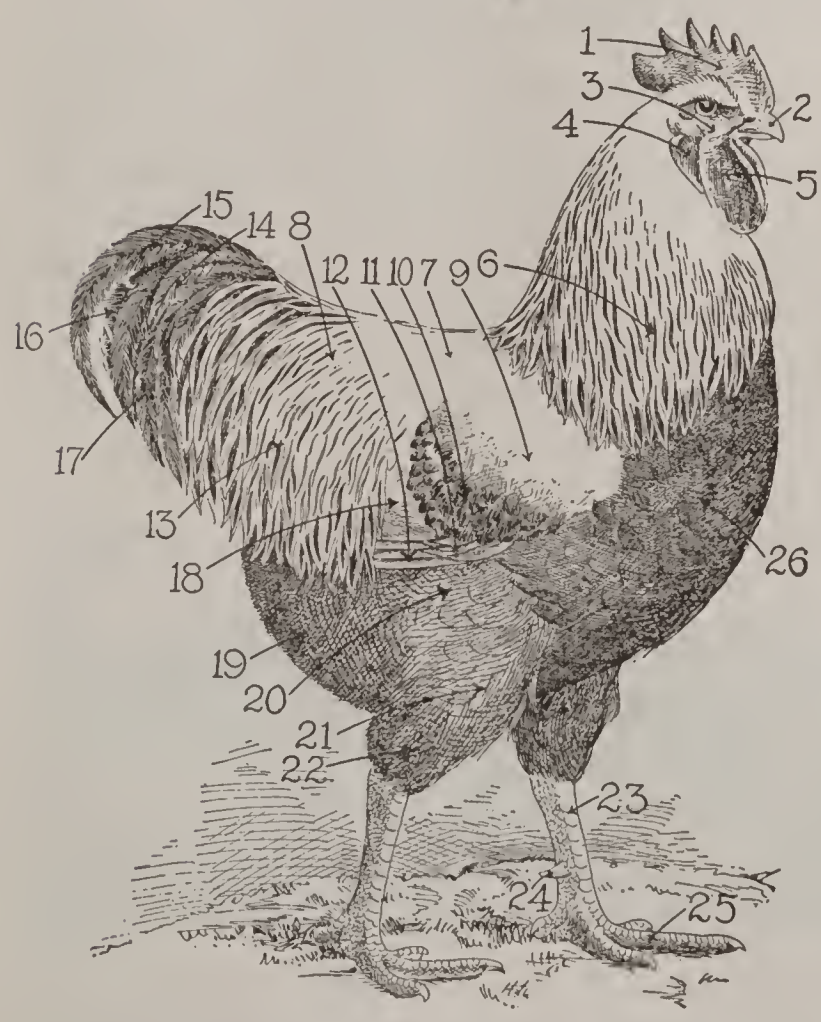
Class	Breed	Variety
American	Plymouth Rock	Barred, white, buff, silver penciled, partridge.
	Wyandotte	Silver, golden, white, buff, black, partridge, silver penciled.
	Java	Black and mottled.
	Dominique	Rose comb.
	Rhode Island Red	Single comb and rose comb.
	Buckeye	Pea comb.
Asiatic	Brahma	Light and dark.
	Cochin	Buff, partridge, white, black.
	Langshan	Black and white.
Mediterranean	Leghorn	Single-comb brown, rose-comb brown, single-comb white, rose-comb white, single-comb buff, rose-comb buff, single-comb black, silver.
	Minorca	Single-comb black, rose-comb black, single-comb white.
English	Dorking	White, silver, gray, colored.
	Redcap	Rose comb.
	Orpington	Single-comb buff, single-comb black, single-comb white.

From the standpoint of utility, chickens are classified as *egg breeds, meat breeds* and *general-purpose breeds.* (Fancy *breeds,* including the bantam fowls, are reared only for peculiarities of appearance, and need not be considered here.) It should be remembered that hard and fast distinctions cannot be set up in this method of classification, for there is wide variation in the qualities of individuals within the same breed. At the same time, the following general statements as to characteristics may be made:

Chickens belonging to the egg-breed group are small and active, mature early, have good foraging habits, are disinclined to brood and are sensitive to cold. Examples are Leghorns and Minorcas.

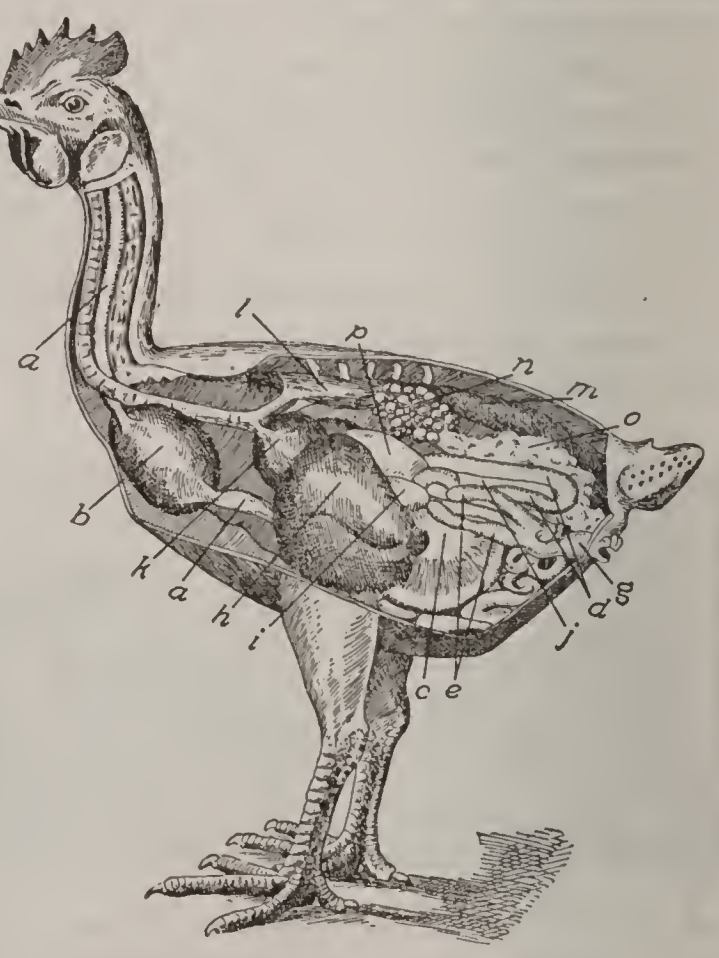
The meat breeds include chickens of large size, slow movements, poor foraging habits and poor laying qualities; they are gentle in disposition, persistent brooders and mature late. Examples are Brahmas, Cochins and Langshans.

General-purpose fowls are of medium size, produce a fair number of eggs, are good table birds,



PARTS OF A FOWL: EXTERIOR

(1) Comb
(2) Beak
(3) Face
(4) Ear lobe
(5) Wattles
(6) Hackle
(7) Back
(8) Saddle
(9) Wing bow
(10) Wing bar
(11) Flight coverts
(12) Primaries
(13) Saddle feathers
(14) Lesser sickles
(15) Sickles
(16) Main tail feathers
(17) Tail coverts
(18) Secondaries
(19) Fluff
(20) Body
(21) Thigh
(22) Knee joint
(23) Shank
(24) Spur
(25) Toes
(26) Breast

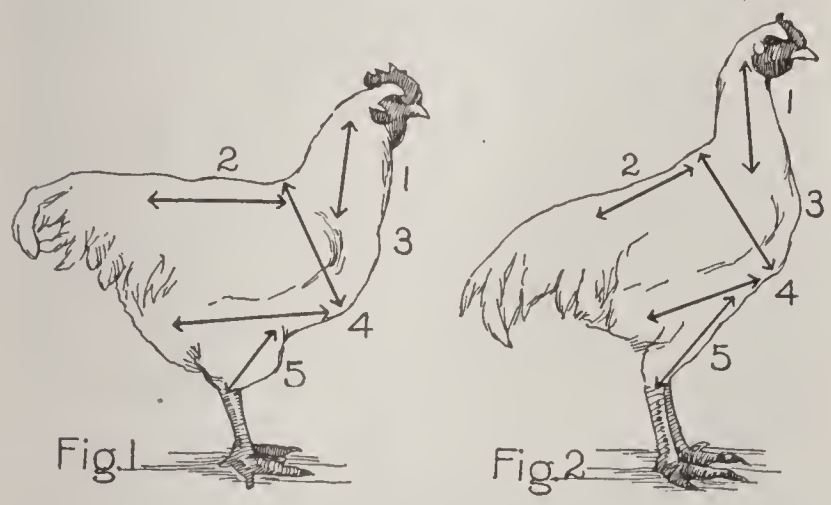


PARTS OF A FOWL: INTERIOR

(*a*) Esophagus
(*b*) Crop
(*c*) Gizzard
(*d, e*) Intestines
(*g*) Rectum
(*h*) Liver
(*i*) Bladder
(*j*) Pancreas
(*k*) Heart
(*l*) Lungs
(*m*) Kidneys
(*n*) Ovaries
(*o*) Oviduct
(*p*) Spleen

and good brooders and mothers. They are more active than meat fowls and less active than the egg layers. Examples are Plymouth Rocks, Wyandottes and Rhode Island Reds.

Care of Poultry. Chickens cannot thrive on wet land, so the plot selected for their range should have good, natural drainage. Accumulations of mud can be prevented by spreading sand or gravel on the ground. Chickens should have plenty of room in which to run about, for they require exercise; if the business is conducted on a general farm and it is not advisable to give them free range, they should be provided with fenced-in yards of reasonable size. Housing is a matter of first importance. Elaborate design and costly fittings are not essential, but convenience and provision for cleanliness and ventilation are prime requisites. The henhouse should be warm in winter and cool in summer, be provided with good roosting facilities, and be so constructed as to prevent the entrance of rats, vermin and other chicken pests. Overcrowding of poultry, especially of the little chickens, should always be avoided. Specific suggestions as to size, material and plan of construction may be found in the numerous poultry books, bulletins and journals continually published (see list at the end of this article).



HOW TO JUDGE FOWLS

Fig. 1 shows a bird of good conformation. Compare neck (1), back (2) and keel (4) with corresponding parts in Fig. 2. This bird has good depth (3), medium length of leg (5) and a plump breast.

Fig. 2 shows a bird of weak constitution and a poor breeder. The neck (1) is too long and slender, the back (2) and keel (4) are too short, the leg (5) is too long, and the breast (3) is too shallow.

Chickens should not be fed in a haphazard manner, for it has been definitely proved that the eggs as well as the meat are affected by the food. Egg layers should be fed a mixed diet of grain, animal food and green matter, and should also be supplied with lime and other mineral matters that enter into the composition of eggshells. Grit for helping digest the food and an abundance of pure water are no less important. Though corn is the standard grain for fattening fowls, wheat and oats are essential for egg layers. In general, egg layers should have a diet in which the ratio of protein to carbohydrates and fat is one to four or five. The following table shows a number of the standard poultry foods and their percentage composition:

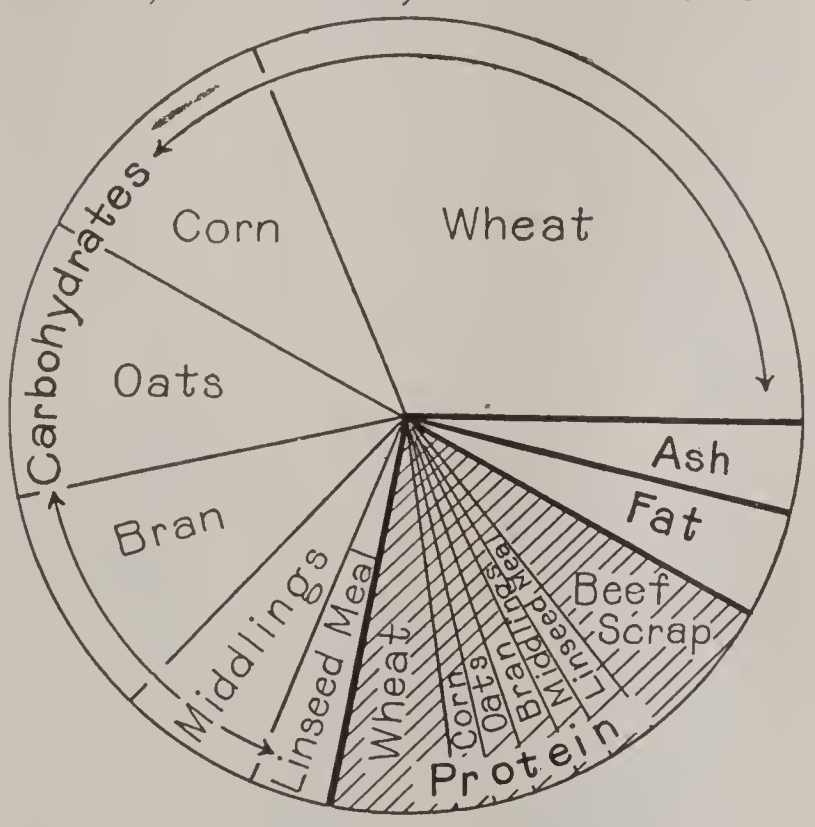
Percentage Composition of Foods

GRAIN	WATER	ASH	PROTEIN	CARBOHYDRATES FIBER	CARBOHYDRATES N-FREE EXTRACT	FAT
Wheat	10.5	1.8	11.9	1.8	71.9	2.1
Corn	10.9	1.5	10.5	2.1	69.6	5.4
Kafir Corn	9.3	1.5	9.9	1.4	74.9	3
Oats	11	3	11.8	9.5	59.7	5
Peas	10.5	2.6	20.2	14.4	51.1	1.2
Barley	10.9	2.4	12.4	2.7	69.8	1.8
Rye	11.6	1.9	10.6	1.7	72.5	1.7
Buckwheat	12.6	2	10	8.7	64.5	2.2
Cowpeas	14.8	3.2	20.8	4.1	55.7	1.4
Sunflower	8.6	2.6	16.3	29.9	21.4	21.2
Millet	14	3.3	11.8	9.5	57.4	4
Sorghum	12.8	2.1	9.1	2.6	69.8	3.6
Flaxseed	9.2	4.3	22.6	7.1	23.2	33.7
GREEN FOODS						
Alfalfa	71.8	2.7	4.8	7.4	12.3	1
Clover (Red)	70.8	2.1	4.4	8.1	13.5	1.1
Kale	88.2	1.8	2.5	1.5	5.3	0.6
Cabbage	90.5	1.4	2.4	1.5	3.9	0.4
Vetch	69.2	2.7	3.7	9.6	14.2	0.5
Mangelwurzel	91.2	1	1.4	0.8	5.4	0.2
Turnip	90.5	0.8	1.1	1.2	6.2	0.2
Sugar beet	86.5	0.9	1.8	0.9	9.8	0.1
Dried beet pulp	6.4	3.3	10.8	19.8	58.4	1.3
Carrot	88.6	1	1.1	1.3	7.6	0.4
Potato	78.9	1	2.1	0.6	17.3	0.1
Artichoke	79.5	1	2.6	0.8	15.9	0.2
ANIMAL FOOD						
Skim milk	90.6	0.7	3.3	...	5.3	0.1
Buttermilk	90.3	0.7	4	...	4.5	0.5
Whey	93.8	0.4	0.6	...	5.1	0.1
Cottage cheese	72	1.8	20.9	...	4.3	1
Milk albumen	18	3	43	?	?	1.5
Beef scrap	10.7	4.1	71.2	...	0.3	13.7
Cut bone	34.2	22.8	20.6	...	1.9	20.5
Dried blood	8.5	4.7	84.4	...	...	2.5
Dried fish	10.8	29.2	48.4	...	...	11.6

Breeding and Hatching. Poultry raisers are now giving much attention to the subject of breeding, as they know that the success of the business depends upon the elimination of the

weakling and the propagation of strong, vigorous fowls. The important points of difference between a fowl of weak constitution and a vigorous one are shown in the diagram on page 4801. Within recent years the science of artificial hatching has been brought to a high degree of excellence. This subject is treated in these volumes under the heading INCUBATOR.

Food Values. Chicken meat is universally esteemed for its delightful flavor. Another point in its favor is its attractive appearance, for chicken "looks good to eat," whether broiled, fried, roasted or stewed. As it is easily digested it is an excellent food, both for healthy persons and for invalids. The meat of young chickens, called *broilers,* has less fat in its com-



AN EGG LAYER'S BALANCED RATION

position than that of older fowls, but it is considered more delicate in flavor. The average composition of broilers and fowls is as follows:

CLASS	REFUSE	WATER	PROTEIN	FAT	ASH
Broilers	41.6	43.7	12.8	1.4	.7
Fowls	25.9	47.1	13.7	12.3	.7

Broilers have a fuel value of 305 calories (see CALORIE) per pound, and fowls, of 765 calories.

Consult Robinson's *Principles and Praetiee of Poultry Culture;* Weir's *The Poultry Book;* Watson's *Farm Poultry;* Lewis' *Productive Poultry Industry;* Dryden's *Poultry Breeding and Management;* United States Department of Agriculture, *Bulletins 29, 31* and *51.*

Related Subjects. The reader is referred to the following articles in these volumes:

Cookery
Duck
Egg
Food Products, Preservation of
Fowl
Goose
Guinea Fowl
Incubator
Pheasant
Turkey

POUND, a unit of weight for measuring many commodities. There are three denominations—*apothecaries', avoirdupois* and *troy.* The pound *avoirdupois* contains 7,000 grains and is divided into sixteen ounces. The *troy* and *apothecaries'* pounds contain 5,760 grains each and are divided into twelve ounces (see table in the article DENOMINATE NUMBERS, page 1765). The grain is the basis of computation in all three denominations and does not itself vary. The *pound sterling,* the highest denomination used in British money accounts, is equal to twenty shillings. It is equivalent to $4.8665 in United States money; to 25.175 French francs, Spanish pesetas or Italian lira; and to 20.412 German marks. The pound sterling received its name from originally being equal to a quantity of silver weighing one pound.

POUSSIN, *poo saN',* NICOLAS (1594-1665), a French historical painter, the founder of what has been called the Heroic school of landscape painting. He was born at Les Andelys, in Normandy, of very poor parentage. Not until he was thirty years of age was he enabled to fulfil a lifelong ambition to study at Rome. There he won fame and fortune. The French king, Louis XIII, upon learning of the success of the absent artist, invited him to return to his native land, offering him palatial apartments in the Louvre and making him his "first painter in ordinary." But Poussin was a man of simple habits to whom the gilded court life had no appeal. Finally, unable to endure the intrigues against him, he returned to Rome, where he remained for the rest of his life. The finest collections of his paintings are found in the Louvre, the National Gallery, London, and in private English collections. Among his most important canvases are *The Shepherds of Arcady, Orpheus and Eurydice* and *Triumph of Flora.*

POUTRINCOURT, *poo traN coor',* JEAN DE BIENCOURT, Baron de (1557-1615), a French colonizer, one of the founders of Acadia. He was a wealthy nobleman of Picardy, who came to Canada in 1603 in the company of the Sieur de Monts, and a year later was given the grant of Port Royal. Instead of building up his colony he devoted most of his energies to trading with the Indians. In 1606 he fortified Port Royal, but he immediately left it to join Champlain on an exploring expedition, which reached the site of the present town of Chatham, Ont. His colony finally fell into the hands of the English, who abandoned it in 1614. Poutrincourt, who had been in France since 1612,

returned to Acadia for a few months, but in 1615 was killed in battle in France.

POWDERLY, *pow'der li,* TERENCE VINCENT (1849-), an American labor and social investigator, was born at Carbondale, Pa. At about fourteen years of age he began work in a machine shop and was a mechanic for the next thirteen years. He was elected mayor of Scranton, Pa., on the Labor ticket, in 1878, 1880 and 1882, and was commissioner-general of immigration of the United States from 1897 to 1902. In 1906 he was appointed special representative of the Department of Commerce and Labor to investigate the reasons for the heavy immigration from Europe, and in 1907 became chief of the Division of Information in the Bureau of Immigration. As a student of present economic and social conditions throughout the world, he became recognized as an authority, for his observation and experience among laborers have not frequently been equaled. His book, *Thirty Years of Labor,* is a valuable review of the industrial tendencies of the period it covers.

POWELL, *pou'el,* JOHN WESLEY (1835-1902), an American geologist and explorer, known especially for his valuable surveys of the Colorado River regions. After completing his education at Oberlin College, in Ohio, he spent several years in research work in natural history and geology. On the outbreak of the War of Secession he enlisted as a private, saw much active service and was promoted to the rank of major. After the conclusion of peace he became professor of geology in Illinois Wesleyan University at Bloomington, and in 1867 accepted the chair of geology at the Illinois Normal University. The following summer Powell began a series of surveys that made him famous. One result of his work was the organization of the United States Geological Survey, of which he was director from 1881 to 1894. His *Contributions to North American Ethnology* is a report of the investigations made by him for the Smithsonian Institution on the subject of the American Indian. Other publications include *Exploration of the Colorado River of the West and its Tributaries, Canyons of the Colorado* and *Introduction to the Study of Indian Languages.*

POWELL, MAUD (1868-1920), an American violinist, born at Peru, Ill. She was educated in the public schools of that city, and from 1881 to 1885 studied the violin in Chicago, Leipzig, Berlin and Paris. In 1885 she made her first public appearance at Berlin, and within the next five years gained the reputation of being the greatest of all women violinists. Her work as a soloist with such orchestras as those of Thomas, Siedl, Nikisch and Damrosch proved that no requirements of technique, volume or tone were too difficult for her, while her frequent tours of America, Europe, Asia, South Africa and Australia have not impaired the freshness and inspiring character of her playing. It has frequently been declared that she introduced more new violin music to the public than any other musician in America. In 1904 she married H. Godfrey Turner of London.

POWER, in arithmetic and algebra, the result obtained when a quantity is multiplied by itself a specified number of times. The second power, or square of a number, is found by multiplying the number by itself once; the product obtained by taking a number three times as a factor is the third power; four times, the fourth power, and so on. Thus, the second power of 6 (written 6^2)$=6\times6$, or 36, while the third power (written 6^3)$=6\times6\times6=216$. The degree of the power, or the number of times the given quantity is taken as a factor, is expressed by a number called the *exponent,* which is written to the right and above the quantity, as 6^3, 3 being the exponent. The process of finding a power of a number is called *involution.*

The second power of a quantity is found in estimating the area of square or circular surfaces, while the third power aids in finding the cubic capacity of solids.

POWER OF ATTORNEY, a legal instrument authorizing the person named in it to act as the agent or the attorney for the one who signs it. If the power of attorney is to be recorded it must be signed by a notary public. A *general* power of attorney authorizes the agent or attorney to act for the principal without limitation. A *special* power limits him to the act or acts specified in the instrument. Courts place close construction upon the power of attorney, requiring the agent to keep strictly within the limits of the instrument. The death of the principal revokes the power of attorney.

General Form of Power of Attorney

Know all Men by These Presents, That I, John Ward of Kansas City, County of Jackson, and State of Missouri, have made, constituted and appointed and by these presents do make, constitute and appoint, Joseph King my true and lawful attorney for me and in my name, place and stead (*here state the purpose for which the power is given*), giving and granting unto my said attorney full power and authority to do and perform

all and every act and thing whatsoever requisite and necessary to be done in and about the premises, as fully to all intents and purposes as I might or could do if personally present, with all power of substitution and revocation, hereby satisfying and confirming all that my said attorney or his substitute shall lawfully do or cause to be done by virtue thereof.

In witness whereof, I have hereunto set my hand and seal the third day of March, one thousand nine hundred and seventeen.

JOHN WARD (Seal).

Signed, Sealed and Delivered
in Presence of
HOWARD JOHNSON,
Notary Public.

POWERS, HIRAM (1805-1873), an American sculptor, born at Woodstock, Vt. After years of struggle he was enabled to realize his ambition to study in Italy. He removed to Florence in 1837, where he remained for the rest of his life. A touch of tender melancholy is discernible in his *Eve Disconsolate,* the *Last of the Tribe* and the *Greek Slave.* The last named, his best-known work, of which he made six replicas, is noted for its purity of treatment and beauty of form. *The Fisher Boy, Proserpine* and *Il Penseroso* are the titles of other sculptural pieces which won him recognition at home and abroad. He executed also busts and statues of many eminent Americans, including Franklin, Washington, Webster, Calhoun and Sheridan.

POWERS, THE GREAT, the term used in modern international diplomacy to designate the most powerful nations of the world. At the beginning of the twentieth century, the nations included in the term were Austria, France, Germany, Great Britain, Italy, Japan, Russia and the United States. The War of the Nations, which began in Europe in 1914, did not effect important changes in the list of powers of highest rank.

POWHATAN, *pou ha tan'* (about 1550-1618), an American Indian chief, born near Jamestown, Va. His real name was WAHUNSONACOOK, Powhatan being the name of his tribe. It is believed that in his early manhood he was chief of eight tribes, but before his death had become leader of thirty, numbering more than 8,000 members. His domain was large, extending southward for about three hundred miles from the James River and about two hundred miles inland from the seacoast. He was a man of shrewdness, genuine executive ability and cruelty, and demanded implicit obedience from his subjects.

In 1607 he captured Captain John Smith and was about to kill him when, according to Smith, his daughter Pocahontas begged successfully for the white man's life (see POCAHONTAS). In 1609 Smith crowned him emperor of the Indies, but needed supplies hoped for from the Indians in return for this honor were not granted, and Smith then tried to capture him. Powhatan henceforth planned the destruction of the English, and was active against them until Pocahontas married John Rolfe in 1614. After that event he was always friendly, and he frequently supplied the settlers with food.

PRAETOR, *pre'tor,* one of the most important magistrates in the Roman republic. Originally the name was but a title of honor borne by the consuls, but when, in 367 B.C., the plebeians were given rights to the consulship, the patricians demanded that they be allowed to appoint the new officers from their own number. To this new magistrate, who was called *praetor,* was given the judicial part of the duties of the consuls. When the office assumed greater importance the plebeians demanded that the right to election be thrown open to them also, and this privilege they gained in 337 B.C. About 227 B.C. the number of praetors was increased to four; at a later date there were sometimes from twelve to eighteen. A praetor held office for a year, and at the close of his term was usually sent as governor to a province. To the edicts of the successive praetors of the Roman law is said to owe much.

PRAETORIAN, GUARD, *pre toh'ri an,* the personal guard of the Roman emperors. The commander-in-chief of the Roman republic had a bodyguard which was called by this name and which consisted of picked men from the legions. Augustus made of the praetorians a standing army consisting of nine cohorts of 1,000 men each, three cohorts being kept in Rome, the others in near-by cities. Under Tiberius the cohorts were given a permanent camp in the city, and under Vitellius their number was increased to sixteen. Members received double the pay of the regular soldiers, were held to be equal in rank to the centurions of the legions, and at the close of their sixteen-year terms were given a liberal reward. The praetorians greatly abused their privileges, gaining in time the chief power in the state, appointing and deposing the emperor at will. It became absolutely necessary for a man who wished to be emperor to win their favor in some way or to buy it after his election. The praetorian guard was abolished A.D. 312 by Constantine.

PRAGMATIC SANCTION, *prag mat' ik sangk'shun,* in European history, an imperial edict or decree having the force of fundamental law. Of several pragmatic sanctions the one of greatest importance was that issued by Emperor Charles VI, in 1713. This is usually referred to by historians as the Pragmatic Sanction. Charles, who was Holy Roman Emperor, had no male heirs, and so issued a decree settling his possessions on his daughter, Maria Theresa. Though several of the great powers agreed to observe this decree, they broke their pledges after Charles's death. Maria Theresa's efforts to maintain her rights resulted in the War of the Austrian Succession (see subhead under SUCCESSION WARS).

PRAGUE, *prayg,* the former capital of Bohemia, now capital of Czecko-Slovakia and renamed *Praha* by the Czecho-Slavs, is situated 150 miles northwest of Vienna, at the base and on the slopes of hills which skirt both sides of the picturesque Moldau River, spanned by many tower-guarded bridges. The visitor can hardly believe, as he looks from the old fortified citadel above the river over the lofty towers which rise above many medieval palaces, churches and public buildings, that at the base of these hills nestles a thriving twentieth-century city; for Prague was the great center of the commerce of Bohemia and the seat of an important transit trade. Its commercial importance is enhanced by its situation on a navigable waterway and its position at the junction of seven railroads.

The city is divided into seven districts, the most interesting of which is the Altstadt, on the right bank of the river. There are numerous public gardens and walks in the suburbs, and several royal parks are in the vicinity. Everywhere are to be found statues, tablets and historical relics. Among the points of special interest are the town hall, the new Czech National Theater, the old Jewish graveyard, the Czernin Palace, now used as a barracks, and an imposing Renaissance structure containing a picture gallery, conservatory of music and art industrial museum. Among the city's many churches are the domed Jesuit church of Saint Nicholas; the Teyn (old Hussite) Church; and the Kreuzherren Church, constructed after the plan of Saint Peter's at Rome. In addition to the famous University of Prague the educational institutions include the Royal German and Royal Bohemian Polytechnic institutes. The industrial establishments are numerous and varied, and include factories for the manufacture of railway cars, leather, cotton goods, gloves, chemicals, flour and beer, and printing and publishing houses. The city is an important sugar market and center of trade for local manufactures.

Prague is supposed to have been founded by German settlers about 1100. In the fifteenth century it was captured and almost destroyed by the Hussites, but was rapidly rebuilt. Up to the time of the fall of Napoleon the city suffered from the troubles in which the House of Austria was involved, but since then has grown rapidly and prospered. Population in 1910, 223,741; in 1921 the population of the city and suburbs was 676,476.

PRAIRIE, *pra'ri,* a term applied most frequently to the broad, grass-covered meadows lying in the region of the Mississippi and Ohio valleys, where the land is gently rolling and often almost treeless. Illinois has been nicknamed the "Prairie State," but all the territory in Western Ohio, Indiana, Illinois, Missouri, Iowa and Wisconsin in the United States and north into the great Canadian provinces is included in the wide expanse, which is continued by the Great Plains to the base of the Rocky Mountains. The surface of the prairie section is not so level as that on the plains, for low hills and shallow river valleys often relieve the monotony of the landscape. The prairie region lies from 300 to 1,500 feet above sea level, and sandstone and limestone deposits underlie the heavy rich soil, which is admirably suited to the growth of cereals, chiefly corn and wheat. See PLAIN; PLATEAU.

PRAIRIE CHICKEN, the name given locally in the United States to the *pinnated grouse,* or the grouse with winglike tufts of feathers on the neck. This bird is described and pictured in the article GROUSE, subhead *Prairie Chicken,* on page 2629.

PRAIRIE DOG, a troublesome member of the ground-squirrel family, once very common in the plains of Western North America from Canada south into Mexico. The animal has become a serious pest because of its fondness for meadow grasses, alfalfa and grain. In some places the burrows of a prairie dog colony cover several hundred square miles. Such a community, according to the United States Department of Agriculture, will devastate an area that would feed 1,500,000 cattle. The animal is strong and well built, about a foot in length, and is covered with coarse, gray-brown hair. It has small, beady eyes, pouched cheeks and a long tail.

Much ingenuity is shown in the digging of the burrow. About the entrance is thrown up a mound of earth which prevents water from running into the home in time of heavy rainfall. The animal then digs a steep tunnel running downward for twelve feet or more. Next it burrows a gallery on a horizontal plane, occa-

PRAIRIE DOG AND HER YOUNG

sionally making a room for the storage of fodder or the accommodation of the family. When the food at hand is exhausted a new entrance is made nearer the base of supplies, as the prairie dog has many enemies and must be very cautious. It is preyed on especially by snakes and ferrets. Farmers exterminate these ground squirrels by dropping bisulphide of carbon into their burrows and covering the entrances. The fumes of this substance are poisonous to the animals.

PRAXITELES, *prak sit' i leez,* one of the greatest Greek sculptors of the fourth century B. C. With his contemporary, Scopas, Praxiteles led the later Attic School, so called to distinguish it from the earlier Attic School of Phidias. Very little is known of the life of Praxiteles, except that he was a citizen of Athens and that he flourished about 350 B. C. Most of his principal works have perished. He excelled in the portrayal of the human form, especially the female figure, and is said to have established the type for Eros and the Satyr, conceiving them in new forms of youth and beauty. He also gave a new conception of the beauty of Aphrodite in his statues of this goddess at Cnidus, Cos and other places. Among his other notable works are numerous statues of *Apollo,* the finest representing him as the python slayer; *Hermes Carrying Dionysus,* found at Olympia in 1877, and the group *Niobe and Her Children,* now in Florence, which some authorities attribute to Scopas. The *Hermes* group is the only one which is known to be an original. All of the others attributed to him are copies. The gods and goddesses of Praxiteles were ideal figures of earthly loveliness, and his art replaced the more heroic conceptions of the school of Phidias, which preceded him. See PHIDIAS.

Consult Gardner's *Six Greek Sculptors;* Klein's *Praxiteles.*

PRECES'SION OF THE EQUINOXES, *e' kwi nok' ses,* a term used in astronomy to describe the progressive motion of the equinox, the point at which the equator and the ecliptic intersect each other. The precession is a slow westward movement of the equinox along the ecliptic. In its motion the earth does not maintain its axis at an absolute parallel with itself, as, owing to the attraction of the sun and the moon, its axis continually changes its position. The change in position is equal to 50′ 37″ (five-sixths of a degree) annually and would amount to a complete revolution round the pole of the ecliptic in 25,791 years. Precession of the equinoxes, combined with nutation, cause the earth to pursue a deviating path about the pole of the ecliptic, varying up to 200 or 300 miles on either side of the orbit.

As an effect of precession, the signs of the zodiac have changed their positions, each one having moved backward or to the westward. The "first of Aries," the vernal equinoctial point, is now in the zodiacal sign of Pisces and is moving further westward towards the next westwardly sign of the zodiac, Aquarius.

Related Subjects. The following articles in these volumes should be consulted:

Ecliptic	Nutation
Equator	Zodiac

PRECIOUS, *presh' us,* **STONES.** See GEMS.

PREDESTINA'TION, from the Latin words for *determining beforehand,* is the doctrine of Christian theology which asserts that everything that happens has been ordered by God from the beginning of time, and that man is powerless to avert it. The narrower meaning, and the meaning with which the word is generally associated, is that certain people, called the *elect,* are by Divine will foreordained (predestined) to salvation (election); while, on the other hand, certain others are predestinated to everlasting punishment (reprobation). Saint Augustine was the first theologian to make this latter interpretation of the New Testament, and he was followed by Aquinas in the Scholastic Period. Its strongest advocate in modern times has been Calvin (see CALVIN, JOHN).

In its essence predestination is opposed to free will, meaning man's power, helped by Di-

vine grace, to *deserve* salvation through virtuous conduct. It is this difficulty in reconciling human freedom with predestination that has made it the subject of so much dispute. At the present day it receives almost no support. Even the Presbyterian Church, which is an outgrowth of Calvinism, has now so modified its creed as practically to discard the predestination doctrine, making it plain that God's love and forgiveness extend to all mankind and that no one is denied salvation except through his own unrepented sin. See FREE WILL.

PREËMPTION, *pre emp'shun,* literally a *buying before,* is the name given to a method formerly used in the United States whereby private citizens could secure title to public lands. Under this system a citizen was required to file an application for the land he wanted, not to exceed 160 acres, improve it and live on it for six months. At the end of that time he was permitted to buy the land for $1.25 an acre. The term preëmption was applied to this system because the settler, by filing his claim and living on the land, secured the privilege of buying the land before anybody else could take it. Every person over twenty-one years of age, except a married woman whose husband was supporting her, provided he or she was a citizen of the United States or had declared intention to become one, could preëmpt a claim. A person who already owned 320 acres of land, or had abandoned his residence to take up new land in the same state or territory, was not entitled to the privilege of the preëmption.

The preëmption system was established in 1837, and with minor changes in regulations survived until 1891. Under its terms about 200,000,000 acres were transferred from the public domain to private ownership. After the War of Secession there was considerable fraud in preëmptions, notably by land companies, who took advantage of the short term of residence required to make hundreds of applications through "dummy" settlers. The dummies remained on the land for six months, and then turned it over to the companies. The system eventually acquired an evil reputation and was abolished by Congress in 1891. A similar system, but more limited in scope, is in use in Canada.

In International Law. Preëmption is also the right which a nation possesses to seize provisions or other commodities shipped to or from another nation with which it is at war. Technically, the right of preëmption extends only to articles which might be classed as contraband of war, but as each nation may define what it means by contraband, practically all the enemy's commerce is included. It is the custom, however, when such goods are seized, to pay the owner the fair market price for them. See HOMESTEAD LAWS; LANDS, PUBLIC. W.F.Z.

PREMIER, *pre'mi er,* from a French word meaning *first,* refers to the first or principal officer of state at the head of a Cabinet, or Ministry. In European countries where constitutional government is established, the Premier, as chief of the Cabinet, is responsible to the legislative body, or Parliament, and holds office only so long as the party he represents is in power. In case of defeat of the government on any important legislative matter the Premier retires, with his Cabinet, and the leader of the opposition party succeeds him as Premier, by invitation of the sovereign.

In Great Britain the Premier is chosen by the king, and besides being the head of his party, he occupies the position of a "go-between" for Parliament and king. The choice of the Premier is practically the only personal power exercised by the king of England, and even that power is limited, as he must necessarily select a man in whom the party in power will feel confidence. Hence it becomes almost an automatic selection of the acknowledged leader of the dominant party.

In Canada the same method is adopted. When the Conservatives are in power the head of that party becomes Premier; he is selected by the Governor-General, who, however, has really little personal choice in the matter. The same occurs when the Liberals gain the ascendancy. The Premier of Canada is the active as well as the official head of the government and presents to the Governor-General the decisions of the legislative body. The assent of the nominal head is necessary before measures become law, but it is almost never withheld. The Governor-General is consulted, but his consent is taken for granted.

In Canada the Premier must be a member of Parliament, and he is directly responsible to the legislative body and to the people. There is no Premier in the United States government, though the Secretary of State, as first member of the President's Cabinet, is sometimes erroneously referred to as the Premier. See PARLIAMENT; GREAT BRITAIN, subtitle *Government,* page 2586.

PREPOSITION, *prep o zish'un,* a part of speech which does the work of a connective or "relation word," in that it indicates the re-

lation existing between its object and its antecedent. "A word that looks backward as well as forward," is the way in which one grammarian speaks of the preposition, because the antecedent is no less necessary than the object for the complete expression of the thought.

Among the long list of simple prepositions in common use may be mentioned *at, by, against, above, on, upon, from, without, under, over, through* and *during;* and among the phrase prepositions, such expressions as *according to, on account of, corresponding to, by means of, by way of, for the sake of, instead of,* and the like.

The Object of a Preposition. The noun or pronoun which forms the object of a preposition is always in the objective case, except in the idiom known as the "double possessive," where the possessive form follows the preposition *of;* as, "Our Art Institute boasts several paintings *of Millet's;*" "I have a strong admiration for that cousin *of yours.*"

The word governed by the preposition, however, is not necessarily a noun or a pronoun, and for this reason many grammarians prefer to refer to it as a *consequent* rather than an object. Sometimes it is an adjective or an adverb, as in the phrases *on high* and *from afar;* sometimes an infinitive or a participle, as in *except to say* and *satisfied with toiling;* sometimes a phrase, as in the expression *from of old;* sometimes a clause, as in the sentence, *He turned to where they stood waiting.*

Importance and Variety. The preposition was not always so important a member of the word family as it is to-day. In the earlier history of the English language the "possessive in *s*" was employed by good writers in constructions where modern usage insists upon indicating the relation by means of the preposition *of.* For instance, it was not considered incorrect to speak of "the house's roof," though now we say "the roof of the house," reserving the inflected form as a general thing for cases of actual possession; as *the child's toys.*

The importance of prepositions has been increased by the extraordinary variety and flexibility of meaning they have come to acquire as the language has developed. The ordinary relations denoted are those of time, direction, position, cause, agency, purpose, manner, exclusion, separation and so on; but a single preposition may denote a number of these different relations, depending upon the way in which it is used. For example: *With* her work finished (expressing the relation of time) a girl may stop to chat *with* a friend (accompaniment); she may converse *with* animation (manner); she may quarrel *with* a schoolmate (opposition), or paddle *with* an oar (agency); *with* her (estimation) canoeing may be a favorite pastime, and yet *with* (despite) all her opportunities for outdoor recreation, she may become dissatisfied *with* (cause) her mode of life. The common prepositions *for* and *of* have at least ten distinct meanings, and others have almost as varied an application. It is this subtle power of the preposition to express different shades of meaning that makes its mastery so difficult a matter for the foreigner.

The Appropriate Preposition. Just as the same preposition assumes a different significance according to the antecedent with which it is associated, so the same antecedent expresses various meanings as it is combined with different prepositions.

For instance, an expert judge of silks compares one piece of satin *with* another as to texture, sheen or wearing qualities, and then admiringly compares one or both of them *to* the lustrous, pearly lining of a seashell. A child is introduced *to* her teacher and *into* a new environment when she is sent to school; a Congressman introduces an antismoke bill *in* the legislature—*into* conveying the idea of entrance or motion to a more marked degree than *in.* A man may be impatient *with* his servant; he grows impatient *at* a delay in trains, and becomes increasingly impatient *under* the disappointment because he is impatient *for* the arrival of a friend.

The Question of Order. Not so many years ago, every student of English grammar was solemnly warned *never* to let a preposition constitute the last word of the sentence. It was argued that for two reasons "a preposition is a bad thing to end a sentence *with*"—to quote the schoolboy's version of the rule: first, because it ought logically to precede its object; and, second, because it is too insignificant a word to occupy the prominent position at the end. However, if this rule is consistently applied, regardless of ease, directness and idiom, it frequently creates constructions that not only sound stilted, but are lacking in force; as when we turn the vigorous, everyday idiom, "What did you come *for?*" into "*For* what did you come?" The same is true in the case of such expressions as, "The plan was enthusiastically agreed *to,*" "I have no materials to work *with,*" "This is a charming setting for our play to be given *in,*" and the like.

As a general rule it is more harmonious to place the preposition before its object, but there is no reason why such a rule should be blindly enforced in contradiction to the idiom of the language.

Parsing the Preposition. The two essentials in parsing a preposition are to name its object and to point out the word modified by the phrase it introduces.

Type Sentence: "There may be worship without words." *Without* is a preposition of exclusion, showing the relation between its object, *words,* and the antecedent, *worship.* The entire phrase, *without words,* answers the question What kind? and limits *worship* in an adjectival sense.

Common Errors. Only a comparatively few of the cases of misused prepositions we meet in the hurried, careless talk of every day can be touched upon in the following list. Unfortunately there are few cut-and-dried rules that can be formulated for the guidance of the student.

This is between you and I, for *This is between you and me.* According to rule, the object of a preposition is in the objective case; in the case of a compound object, the rule naturally covers both elements. This is an exceedingly common mistake and one which, strange to say, abounds particularly in the speech of those who pride themselves on their respect for the rules of grammar. Omit the object immediately following the preposition, and the mistake becomes plain as daylight, for no one would think of saying *between I.*

For what town are you bound for now? for *What town are you bound for now?* or *For what town are you bound now?* We must avoid duplicating the preposition.

He went for to find his sister, for *He went to find his sister. For to* was formerly in good use, but *for* is now considered redundant.

He jumped in the lake, for *He jumped into the lake. Into* must always be employed when there is the idea of entrance or insertion. If a boy were bathing in the lake and jumped up and down to keep warm, for instance, it would be entirely correct to speak of his jumping *in* the lake, but if we want to convey the thought of plunging, we must make use of *into.* The same distinction is made between *on* and *upon.*

I cannot come without my sister is invited also, for *I cannot come unless my sister is invited also,* or *I cannot come without my sister*—though the latter form does not express the precise idea. *Without* is a preposition and positively must not be used to do the work of the conjunction *unless.*

He earns three thousand dollars per year, for *He earns three thousand dollars a year.* The Latin *per* is properly used only with Latin nouns; as, *per annum, per capita, per diem,* for which the English equivalents are *a year, a head, a day.*

We picked these cherries off of the tree near the gate, for *We picked these cherries off the tree near the gate. Of* is always superfluous after *off.* The preposition is likewise unnecessary in the commonly-heard phrases, *follow after, ponder over, add on, crave for, examine into,* etc.

The poles were set with ten feet between each, for *The poles were set with ten feet between each two.* Between—from *by twain*—always implies the idea of *two,* whereas *each* is singular in force. Another common expression is *Between each act,* in place of *between acts.*

Divide this candy between the three of you, for *Divide this candy among the three of you.* Since *between* signifies *two,* it cannot properly be used when the reference is to more than two persons or things or more than two groups—as in the phrases *between the two families, between the French and English armies.*

The house looks different than what I expected, for *The house looks different from what I expected.* Avoid both *different to* and *different than.*

There is no use in waiting, for *There is no use of waiting.* It is *use of,* never *use in.* This is one of the most common errors. L.M.B.

PRE-RAPHAELITES, *pre raph' a el ites,* a group of English writers and painters about the year 1848 who sought to express in their work and to restore to art the simplicity, sincerity and spirituality that had characterized the painters before the time of Raphael. To this end they founded, in 1848, the Pre-Raphaelite Brotherhood, and for a time published an organ for the statement of their ideas, *The Germ.* The leading spirit in the movement was Dante Gabriel Rossetti (which see). Other prominent Pre-Raphaelites were Rossetti's brother, William Michael, and the painters John Everett Millais (which see) and William Holman Hunt. Their ideas had the warm sympathy of such influential men as John Ruskin, Edward Burne-Jones and William Morris, and because the movement brought back to English painting the spiritual and poetic qualities it had lost, it had far-reaching influence which is felt even to-day. See PAINTING.

PRESBYTERIANS, *prez bi te' ri anz,* a Protestant denomination, so called because its local bodies are governed by *presbyters,* or elders. The pastors, together with the elders, who are elected by the congregations, are intrusted with the spiritual oversight of their churches, while the deacons manage the financial affairs and look after the poor. The pastor and elders constitute a *session,* which is under control of a *presbytery* composed of the ministers and one or more elders from each church in a given district. Three or more presbyteries combine to form a *synod,* which is often a representative body consisting of ministers and elders chosen from the presbyteries; in other cases all members of the presbyteries belong to the

synod. Controlling all is the General Assembly, to which appeals and complaints may be carried from the lower bodies when it meets once a year. In the United States appeals from the synods to the General Assembly are limited to cases involving doctrine and government. Presbyterian doctrine is set forth in the Westminster Confession of Faith and the Longer and Shorter catechisms.

History. At the time of the Reformation, in the sixteenth century, John Calvin organized the Reformed Church at Geneva, Switzerland, under the plan of government which is now used in the Presbyterian Church. Thus he has been considered the founder of Presbyterianism, although the Waldenses (which see) had a similar system of government three centuries earlier. In 1557 some of the most powerful barons in Scotland bound themselves by a solemn "Covenant" to overthrow all attempts to crush Protestantism, which had been introduced into their country by John Knox (which see), and three years later the Reformed doctrine was formally recognized by the Scottish Parliament. Ultimately Presbyterianism was established as the state religion of Scotland. During the seventeenth century the Dutch carried Presbyterianism to America, building the first Reformed Church of the new country at New Amsterdam in 1628. Gradually the denomination broadened its field, until at present there are about 9,000,000 Presbyterians in the world, nearly 2,000,000 of them being in the United States and 1,115,000 in Canada.

There are twelve branches of the Church in America, the two largest being the Northern and the Southern, which separated at the time of the War of Secession; another large branch, known as the Cumberland, was formed in 1810, adopting the Westminster Confession of Faith, which all Presbyterians follow, but making various changes. In 1907 the Cumberland Presbyterians united with the main body, the Northern branch, known officially as the Presbyterian Church in the United States of America. The United Presbyterians of America are distinguished by the fact that they sing only Psalms at their religious services. In 1873 a World's Alliance was organized among all branches, to facilitate and unify their missionary work. E.C.

Consult Hays's *Presbyterians: A Popular Narrative;* Zenos's *The Presbyterian Churches: Their Place in Modern Christendom.*

PRESCOTT, *pres'kot,* a town in Ontario, the county town of Grenville County. It is situated on the Saint Lawrence River, and is the point at which river navigation ends and lake navigation begins. It is twelve miles east of Brockville by rail, and is directly across the Saint Lawrence (one and one-half miles) from Ogdensburg, N. Y. It is a port of call for all boats, both those going upward to the Great Lakes and those going downward on the river. Prescott is on the Canadian Pacific and Grand Trunk railways, and at Ogdensburg, which is reached by a ferry, has connection with the New York Central. Its largest industrial establishments are an emery wheel factory, a million-bushel grain elevator, planing mill, veneer factory and creamery. The Dominion government maintains marine works here. Until the adoption of prohibition in Ontario, during the War of the Nations, a brewery and a distillery were among the largest and most active of the local establishments. Population in 1911, 2,801; in 1921, 2,636. W.J.R.

PRESCOTT, Ariz., the county seat of Yavapai County, is situated at an altitude of 5,347 feet on a broad mesa surrounded by foothills of the Rocky Mountains. It is near the geographical center of the state, 137 miles by rail north and west of Phoenix, the state capital, and is served by the Atchison, Topeka & Santa Fe System. Extensive copper mining, stock raising and agriculture are the chief sources of revenue of the surrounding country. In the center of the city is the Plaza, a park of five acres, in which is the Rough Riders' monument executed by Solon Borglum, and the town has a courthouse, erected at a cost of $250,000, a $90,000 high school, a Carnegie Library, the Pioneers Home, Saint Joseph's Academy, and several sanatoriums and hospitals. The city has an annual celebration of Frontier Days, at which broncho riding is a leading feature. The altitude and fine climate of Prescott are exceedingly beneficial to those suffering with tuberculosis.

The place was settled in 1863 and was named for William H. Prescott, the American historian. It was the former capital of the Territory of Arizona. In the vicinity are many interesting Indian ruins and specimens of rock writing. Population in 1910, 5,092.

PRESCOTT, William Hickling (1796-1859), an American historian, grandson of William Prescott. He was born in Salem, Mass., and educated at Harvard, from which he was graduated at the age of eighteen. Because of the loss of one eye by an accidental injury while in college and the partial loss of the other through

overwork, he was obliged to give up the study of law, and it was only under tremendous difficulties that he wrote his great works. The different parts of these, when taken together, constitute a history of Spain in its relations to America and to the Reformation. He gathered his material from all possible sources, but he had to acquire it through the eyes of a reader.

WILLIAM H. PRESCOTT

Archaeological work in America has progressed greatly since the publication of his histories, and some of his judgments have been in consequence overthrown; but his work still stands as a most striking success. In his own day it was received with the greatest enthusiasm. His most brilliant work is a *History of the Conquest of Mexico,* on which he spent six years. His other books include *The Conquest of Peru* and the *History of the Reign of Ferdinand and Isabella,* and he was working on the third volume of a *History of the Reign of Philip II* when a stroke of apoplexy caused his death. Prescott's chief merits as an historian are his breadth of view and the accuracy of his information. In general he is impartial in his judgments, but at times he does rather more than justice to his heroes. He ranks as one of the greatest of American historians, with Motley and Parkman.

Consult Tichnor's *Life of William Hickling Prescott.*

PRESIDENT OF THE UNITED STATES, the chief executive officer of the United States government. He is the only official who is directly responsible to the whole nation. The Secretary of State and the heads of the other executive departments are responsible to him, and only indirectly to the people. A member of Congress, on the other hand, is responsible only to the state or district which he serves. The unique character of the President's position has made him one of the most powerful rulers in the world. He not only has far-reaching authority, but has the added influence of the moral effect which those powers confer.

Who May Be President. The qualifications for President are few; they are fixed by the Constitution. He must be a native-born citizen of the United States; he must be not less than thirty-five years of age, and must be a resident of the United States for fourteen years preceding his election. The youngest President ever elected was Roosevelt, who was not quite forty-three when he succeeded to the Presidency on the death of McKinley, and was only forty-six when he was elected to that office to succeed himself. William Henry Harrison, the oldest President, was sixty-eight when he was inaugurated. The Constitution further requires the President, before entering on the duties of his office, to swear (or affirm) that he will faithfully perform the duties of the office, and that he will, to the best of his ability, preserve, protect and defend the Constitution of the United States. A President is legally eligible for reëlection an infinite number of times, but no one has served more than two terms, thus observing the precedent set by Washington. It is noteworthy, however, that determined efforts were made to elect Grant and Roosevelt to third terms.

How a President Is Elected. The machinery for electing a President is simple. The candidates are nominated by the political parties in national conventions, and one of them is chosen by "electors," who have been previously named in each state in such manner as the legislature has determined. The balloting for electors occurs on the Tuesday following the first Monday in November of every fourth year. At one time the Presidential electors had considerable freedom of choice, but now they are morally pledged to the party's candidate, and the electoral balloting is merely a matter of form. On the second Monday in January following their election, the electors meet in their respective state capitals to cast their votes for President. These ballots are sent to Congress, which meets in joint session to receive them on the second Wednesday of February. The President is inaugurated on the fourth of March, or on the fifth, if the fourth falls on Sunday.

It is the electoral vote which determines who shall be President, but in every account of a Presidential campaign one is almost certain to read about the "popular vote." This, as a matter of fact, is the vote, cast by the public, for electors. Voting for electors is so much a matter of form, however, that no one says that he voted for John Smith, or James Jones, electors, but that he voted for the candidate for President. What he actually does is to vote for electors who will vote for the candidate named by his political party.

The Presidents of the United States

	BORN	NATIVE STATE	COLLEGE	OCCUPATION OR PROFESSION	POLITICAL PARTY	AGE AT INAUGURATION	SERVED	AGE AT DEATH	PLACE OF BURIAL
1. George Washington	1732	Virginia		Planter	Federalist	57	1789-1797	67	Mount Vernon, Va.
2. John Adams	1735	Massachusetts	Harvard	Lawyer	Federalist	61	1797-1801	90	Quincy, Mass.
3. Thomas Jefferson	1743	Virginia	William and Mary	Planter, Lawyer	Republican*	57	1801-1809	83	Monticello, Va.
4. James Madison	1751	Virginia	Princeton	Lawyer	Republican*	57	1809-1817	85	Montpelier, Va.
5. James Monroe	1758	Virginia	William and Mary	Lawyer	Republican*	58	1817-1825	73	Richmond, Va.
6. John Quincy Adams	1767	Massachusetts	Harvard	Lawyer	Republican*	57	1825-1829	80	Quincy, Mass.
7. Andrew Jackson	1767	North Carolina		Lawyer	Democrat	61	1829-1837	78	Hermitage, Tenn.
8. Martin Van Buren	1782	New York		Lawyer	Democrat	54	1837-1841	79	Kinderhook, N. Y.
9. William H. Harrison	1773	Virginia	Hampden-Sidney	Farmer	Whig	68	1841 (1 mo.)	68	North Bend, Ohio
10. John Tyler	1790	Virginia	William and Mary	Lawyer	Democrat	51	1841-1845	71	Richmond, Va.
11. James K. Polk	1795	North Carolina	University of North Carolina	Lawyer	Democrat	49	1845-1849	53	Nashville, Tenn.
12. Zachary Taylor	1784	Virginia		Soldier	Whig	64	1849-1850	65	Springfield, Ky.
13. Millard Fillmore	1800	New York		Lawyer	Whig	50	1850-1853	74	Buffalo, N. Y.
14. Franklin Pierce	1804	New Hampshire	Bowdoin	Lawyer	Democrat	48	1853-1857	64	Concord, N. H.
15. James Buchanan	1791	Pennsylvania	Dickinson	Lawyer	Democrat	65	1857-1861	77	Lancaster, Pa.
16. Abraham Lincoln	1809	Kentucky		Lawyer	Republican	52	1861-1865	56	Springfield, Ill.
17. Andrew Johnson	1808	North Carolina		Tailor	Republican	56	1865-1869	66	Greenville, Tenn.
18. Ulysses S. Grant	1822	Ohio	West Point	Soldier	Republican	46	1869-1877	63	New York City
19. Rutherford B. Hayes	1822	Ohio	Kenyon	Lawyer	Republican	54	1877-1881	70	Fremont, Ohio
20. James A. Garfield	1831	Ohio	Williams	Lawyer	Republican	49	1881 (6½ mo.)	49	Cleveland, Ohio
21. Chester A. Arthur	1830	Vermont	Union	Lawyer	Republican	50	1881-1885	56	Albany, N. Y.
22. Grover Cleveland	1837	New Jersey		Lawyer	Democrat	47	1885-1889	71	Princeton, N. J.
23. Benjamin Harrison	1833	Ohio	Miami	Lawyer	Republican	55	1889-1893	67	Indianapolis, Ind.
24. Grover Cleveland	1837	New Jersey		Lawyer	Democrat	55	1893-1897	71	Princeton, N. J.
25. William McKinley	1843	Ohio	Allegheny College	Lawyer	Republican	54	1897-1901	58	Canton, Ohio
26. Theodore Roosevelt	1858	New York	Harvard	Publicist	Republican	42	1901-1909	60	Sagamore Hill
27. William H. Taft	1857	Ohio	Yale	Lawyer	Republican	51	1909-1913		
28. Woodrow Wilson	1856	Virginia	Princeton	Educator	Democrat	56	1913-1921		
29. Warren G. Harding	1865	Ohio	Ohio Central	Editor	Republican	56	1921-		

*The Republican party of Jefferson, Madison and Monroe is now known as the Democratic party. Adams was nominally a Republican, but was in reality a Federalist.

Powers and Privileges of the President. The President's duty is to preserve, defend and protect the Constitution. In so doing he manages the foreign relations of the United States; he may call Congress in special session to consider any measures he believes vital to the welfare of the country; he may address Congress in person or in writing for the purpose of outlining his policies or urging legislation; he may veto legislative acts of Congress; he appoints officers of the United States; may grant pardons and reprieves to offenders against Federal laws, and may personally assume command of the army and navy, of both of which the Constitution makes him commander-in-chief. In practice he delegates many of these powers to others, but he alone is directly responsible to the people. The President's right to resign is recognized by the Constitution. For any of his acts he is not liable to an ordinary court or magistrate; but he may be impeached by the House of Representatives and tried by the Senate. If he is convicted and removed from office, he may then be tried as a private citizen in ordinary courts.

The President receives a salary of $75,000 a year, which compensation may not be increased or lessened during his term. He also has the free use of the Executive Mansion, or White House, together with its furnishings and equipment and an allowance for their maintenance, which may vary from year to year. He is also allowed $25,000 a year for the expenses of travel, but he is prohibited by the Constitution from receiving any compensation or emolument from any foreign country or ruler.

Consult Cleveland's *Independence of the Executive;* Bryce's *American Commonwealth.*

Related Subjects. The reader is referred to the following articles in these volumes:

Electoral College
Impeachment
Political Parties
Presidential Succession Act

PRESIDENTIAL SUCCESSION, *prez i den' shal suk sesh' un,* **ACT.** Every American knows that if the President of the United States does not complete his term of office he is succeeded by the Vice-President, but how many know what would happen if the Vice-President should resign or should die? During the first decade of the Union no one knew, for the Constitution said nothing about it, and no laws had been passed to provide for such an emergency. In 1792 Congress ruled that the temporary President of the Senate and the Speaker of the House of Representatives should be next in succession to the Vice-President, but nearly a century later the law was changed so that a President's temporary successors would be those more fitted to carry out his policies. Under this law of 1886 the succession is in the following order:

Secretary of State
Secretary of the Treasury
Secretary of War
Attorney-General
Postmaster-General
Secretary of the Navy
Secretary of the Interior

The offices of Secretary of Agriculture, Secretary of Commerce and Secretary of Labor did not exist in 1886, so the holders of them are not in the list of possible Presidents by succession. Whichever of the Cabinet members does assume the executive office must, if Congress is not in session, summon it to meet within twenty days to provide for a Presidential election. No member of the Cabinet who is in the succession named above may succeed to the Presidency under the act of 1886 if he is not a natural-born citizen of the United States. In such dilemma the choice would pass to the next eligible Cabinet member.

PRESS, Liberty of the. In times of peace all liberal governments give their citizens the right to publish anything they choose, making them responsible under the law of libel for false statements. This privilege, known as *liberty of the press,* is one of the fundamental rights of the people of democratic nations, and it has been won, like other common rights, after centuries of struggle. For the protection of society, certain laws restricting the liberty of the press are necessary. It is customary, for example, to forbid the publishing of libelous and obscene matter, and in some countries the right to criticize the policies of the government or of high officials is greatly curtailed, even in time of peace. This is true especially in Germany and Spain. Probably the greatest liberty in this matter is found in the English-speaking countries—England and its colonies and the United States. The first amendment to the American Constitution declares that Congress shall pass no law abridging the freedom of the press. A determined effort was made by the administration to have Congress pass a censorship bill curtailing the power of the press after America's entrance into the War of the Nations. The effort was unsuccessful. See Libel.

PRESSBURG, *pres' boorK,* the former capital of Hungary, and present capital of the

county of Pressburg, is situated in the new state of Hungary, thirty-five miles east of Vienna. Locally it is called *Pozsony*. It has a picturesque location on the north bank of the Danube River, in the region of the Carpathian Mountains. Pressburg, with its many interesting churches, palaces and historic buildings, and its spacious boulevards, is one of the most attractive cities in Hungary. Among the chief points of interest are the Landhaus, where formerly the Hungarian Diet held its sessions; the medieval town hall, with a museum of Roman antiquities; a handsome equestrian statue of Maria Theresa, and a finely appointed library. Industrially the place is important as a manufacturing center. Here are located a dynamite works, a large brush factory, an oil refinery and manufactories of cloth, leather, machinery, chemicals and other products. The city has an area of twenty-nine square miles and a population of 78,223. At Pressburg, in 1805, the Emperor Francis and Napoleon concluded an important treaty.

PRES'TON, an important manufacturing town in England, situated at the mouth of the River Ribble, in Lancashire, twenty-one miles northeast of Liverpool. The original staple manufacture of the town was linen, but it has been superseded by cotton, and Preston is now one of the chief centers of cotton manufacturing in Lancashire. It is also an important railway center, while the dredging of the river and the harbor improvements have given a strong impetus to the shipping trade, which consists mainly of the export of coal and the import of timber, iron and grain. There are brass and iron foundries, iron shipbuilding yards, machinery and boiler works, breweries, malt houses and tanneries. During the civil wars in England, Preston was a center of Royalist sentiment. The Scotch Royalists were defeated there by Cromwell in 1648, but the town stanchly supported the Old Pretender in 1715 and the Young Pretender in 1745. Population in 1921, 117,426.

PRESTON, a town in Waterloo County, Ontario, popularly known as the Hub of Waterloo County. It is on several electric interurban lines and on branch lines of the Canadian Pacific and Grand Trunk railways, four miles north of Galt, eight miles south of Kitchener (formerly Berlin) and fifty-seven miles west of Toronto. Running through the town are two small rivers, the Speed and the Grand, which are not navigable, but they add greatly to the attractiveness of the site. Preston is an important manufacturing community. Its largest establishment, having about 500 employees, makes steam and electric passenger cars; of the latter it is the greatest manufacturer in Canada. Other large factories make stoves and ranges, office and school furniture, shoes, metal shingles, window sash and other metal materials for building, cloth and dress goods, household furniture, boys' sleds and express wagons, flour, woodworking machinery and hockey sticks. The pioneer factory to make hockey sticks on a commercial scale is located at Preston.

The town owns and operates the waterworks and electric-light plant. The public library and the post office, the latter completed in 1915, the Merchants Bank building and the public school are noteworthy structures. Preston is said to be the best paved town in Ontario. Mineral springs draw many visitors each year. About a third of its population is German, or of German descent. Population, 1921, 5,423. C.E.H.

PRETORIA, *pre toh'ri a,* the seat of government of the Union of South Africa and the capital of the Transvaal province, is situated forty-six miles by rail northeast of Johannesburg. It occupies both banks of the Aapies, a branch of the Limpopo, and has wide avenues lined with willows and many attractive buildings. The chief structures are the University College Library, the government buildings and the post office. Pretoria was founded in 1855, and was named after Andries Pretorius, the Dutch leader. When the Union of South Africa was constituted in 1909, Pretoria and Cape Town were rivals for the honor of being named the capital; this was adjusted by making Pretoria the seat of administration and Cape Town the seat of legislation. Population in 1921, 73,779, of whom 45,163 were whites.

PREVAIL'ING WEST'ERLIES, the prevailing winds that blow over the north and south temperate zones in an easterly direction. In the southern hemisphere these winds come from the southwest, and in the northern hemisphere, from the northwest. In the southern hemisphere the prevailing westerlies attain such force and velocity on the sea that the sailors call them the "roaring forties." Owing to the great land masses in the northern hemisphere the prevailing westerlies of the north temperate zone are frequently diverted from their course by mountain ranges. They are also interrupted by the great cyclonic storms that are common over land and sea in this zone. The United States and the southern half of Canada are within the path of the prevailing westerlies,

and while their direction may be changed near the surface, it is usually constant in the upper air, as may be seen by watching the clouds, whose movement is eastward.

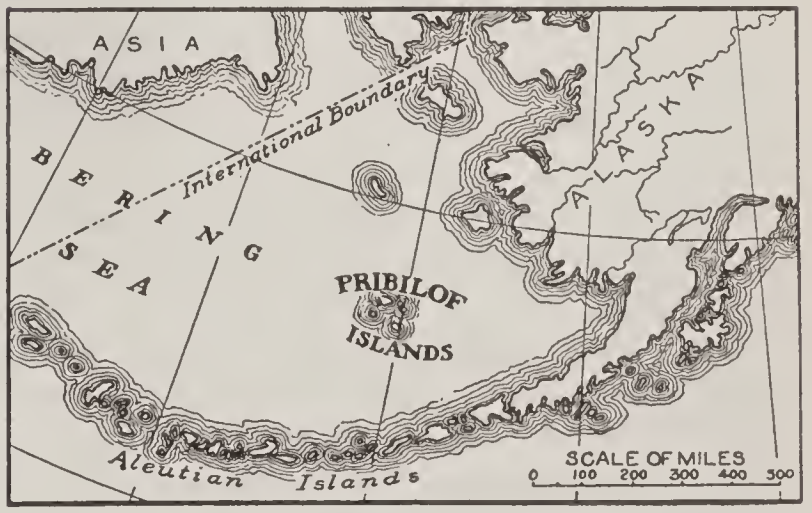
In the days of sailing vessels navigators going from the British Isles to Australia went by way of the Cape of Good Hope and returned by way of Cape Horn, these courses giving them fair winds during both voyages. The occasional presence of North American birds in Western Europe is accounted for by the fact that these winds aid them in crossing the Atlantic. The prevailing westerlies as a surface current usually bring clear skies and lowering temperature. See TRADE WINDS; WIND.

PREVOST, *preh vo',* SIR GEORGE (1767-1816), a British soldier and colonial administrator, Governor-General of British North America during the War of 1812. He was born in New York City. His father, Augustine Prevost (1725-1786), was a general in the British army during the Revolutionary War in America, and the son naturally entered the army at an early age. Beginning with the rank of captain in 1783, he rose gradually, after seeing service in the West Indies, until he was created baronet and major-general in 1805. Three years later he was appointed lieutenant-general, and was sent to Nova Scotia as lieutenant-governor. He succeeded Sir James Craig in 1811 as Governor-General of the British colonies in North America. In this position he was nominally commander-in-chief of the British armies. Unfortunately his attempts to win military fame failed, notably at Sackett's Harbor and Plattsburg. After these defeats, which were attributed to his lack of enterprise, he was recalled and summoned before a court-martial, but he died before the verdict was reached. Prevost was a governor and a soldier of some ability, but both as a soldier and as an administrator history inclines to find him unequal to the situation he had to face in the War of 1812.

PRI'AM, in Greek mythology, the son of Laomedon and the last king of Troy. By his second wife, Hecuba, he had nineteen children, among whom were Hector, Paris, Cassandra and Polyxena, all famous in the Trojan War; in all, he had fifty sons and twelve daughters. Hesione, the sister of Priam, had been carried into Greece by Hercules, and when Priam was well established on his throne, he equipped an expedition for the recovery of Hesione, placing his son Paris at its head. Neglecting his father's commission, Paris carried away Helen, the wife of Menelaus, king of Sparta.

Out of this grew the Trojan War, which might have been averted by Priam if he had consented to give up Paris and Helen when the messengers first appeared in front of Troy. As he declined to do this, the famous siege continued for ten years, and during that time Priam saw most of his sons killed in the defense of their city. When Hector, the best and bravest, was slain by Achilles, the father went to the Grecian camp and begged the body of his son. Even the gods assisted him in reaching the tent of Achilles, where he was received with the honor due his position, and Achilles not only returned the body of Hector, but granted a truce of twelve days for the funeral ceremonies. When Troy fell into the hands of the Greeks, Priam was killed by Neoptolemus, the son of Achilles, at the altar of Jupiter, to which he had fled for protection. See TROY, and references there suggested.

PRIBILOF, *pre'be lof,* **ISLANDS,** the home of the fur seal, are situated in the Bering Sea, 200 miles southwest of Alaska's mainland. They belong to the United States. Saint Paul and Saint George are the largest of the group;



PRIBILOF ISLANDS

their areas are thirty-five and twenty-five square miles, respectively. The former has a population of 200; the latter, 90. There is a United States wireless station on Saint Paul. Because of the nature of the industry on the islands, entirely connected with the seal, sobriety is essential among all classes of their people. In 1915 the national government made the islands prohibition territory, completely barring every kind of intoxicating liquor. See SEAL.

PRICE, STERLING (1809-1867), an American soldier who achieved distinction as a Confederate general in the War of Secession. He was born in Prince Edward County, Va., educated at Hampden-Sidney College and in 1831 removed to Missouri. In 1844 he was elected to Congress, but resigned to serve in the Mexican

War, and in 1847 was made military governor of the Mexican state of Chihuahua. From 1853 to 1857 he was governor of Missouri, and at the beginning of the War of Secession joined the Confederacy, becoming major-general of the Missouri volunteers. At first he made a great effort to win Missouri from the Federals but was finally compelled to abandon the idea, and his forces retreated into Arkansas. He served under Beauregard and Van Dorn around Corinth, but in 1863 was transferred west of the Mississippi River. After the war he endeavored to found a Southern colony at Cordoba in Mexico, but the plan failed, and in 1866 he returned to Missouri.

PRICKLY, *prick'li,* **ASH,** a genus of American trees or shrubs belonging to the rue family, the bark of which has medicinal value. In the Southern states is found a species whose bark is called "sting tongue" by the negroes. They chew it for the relief of toothache, and the tree is locally known in the South as *toothache tree.* It is usually not over twenty-five feet high, and bears small, green-colored flowers. A northern specimen, occurring on the mountain sides from Quebec west to Nebraska and Missouri, is a shrub. The name *prickly ash* refers to the sharp prickles on the twigs, and to the similarity between the leaves of the prickly ash and those of the true ash. See Ash.

PRICKLY PEAR, or **INDIAN FIG,** a group of useful cactus plants, several species of which occur abundantly in the Southwestern United States. The common prickly pear has a flat, jointed stem which produces clusters of spines instead of leaves. Red, white or yellow flowers spring from these clusters of thorns; the fruit, resembling a pear in appearance, is edible and nutritious, but like the stem is often covered with sharp spines. After the prickles are removed, the fruit is used as a cattle food and is thought to be about equal to sugar beets in food value. The Arizona Experimental Station has introduced the practice of removing the spines by singeing them with a gasoline burner, but the most notable experiments have been made by Luther Burbank, who has produced a spineless variety (see Cactus; Burbank, Luther).

In Mexico, the plants are dried and used as fuel, and their fruits, called "fish from the fence" by the native Mexicans, are sold in the markets as a common article of food. The plant has been introduced into the Mediterranean countries, where it is cultivated for its fruit. Its roots penetrate rocky crevices and make barren soil suitable for vegetation of other kinds. On Mount Vesuvius, the prickly pear is planted in the lava seams as soon as the flow has cooled, to prepare the barren ground for cultivation.

PRIEST, the title given ordained ministers in the Roman Catholic, Orthodox Greek and Episcopal churches. It is the duty of priests to care for the spiritual needs of their people and to perform the rites and ceremonies and expound the doctrines of their respective denominations. In the Roman Catholic Church there are many orders of priests, all of whom are pledged to refrain from marrying. Some take vows of poverty and self-sacrifice. Priests have the lowest rank in the Roman Catholic hierarchy. In the Episcopalian bodies the priests form the second order of clergy, the bishops ranking first. The institution of priesthood had an important place in various religions of antiquity, especially among the Egyptians, Hindus and Hebrews. See High Priest.

PRIMARY, *pri'ma ri,* **ELECTION,** an election in which the registered voters express their preference for the candidates for office in their respective parties. The primary election is a *nominating* election; it chooses candidates who in turn stand for election at forthcoming regular elections. Each candidate in a primary has his name placed on his party's ticket by a petition, which must be signed by a certain per cent of the legal voters of his party residing in the district. If the candidate is running for a county office, the petition must bear the names of the required per cent of the voters of his party in the county; if he is running for a state office the specified percentage of voters in the state is required.

At a primary election the voter must declare what his party allegiance is before receiving his ticket; he cannot vote in a primary except for men on his party ticket. However, when the regular election day arrives, he may vote with absolute independence. If the voter then prefers the nominee of some other party he is at liberty to vote for him.

At first primaries were restricted to local elections, but now they are general throughout the United States, and state officers, representatives in Congress, United States senators and Presidential electors in many states are nominated at primary elections. The primary is conducted the same as any other election, and is governed by the same laws except that the voter is restricted to voting for candidates in his party. The direct primary is an American

institution, and has not as yet been adopted to any extent in countries other than the United States.

Consult Merriam's *Primary Elections;* Fanning's *Select Articles on Direct Primaries.*

PRIMATES, *pri ma' teez,* the highest order in the animal kingdom. It includes man and those animals which are nearest to him in physical characteristics (see list of related subjects, below). The name is derived from the Latin *primus,* meaning *first.* The order primates is a division of the class mammalia.

Related Subjects. For a discussion of the chief characteristics of the animals included in the order and for other points of interest see the following articles:

Ape	Lemur
Aye-Aye	Mammals
Baboon	Man
Chimpanzee	Monkey
Gibbon	Orang-utan
Gorilla	Zoölogy

PRIMOGENITURE, *pri mo jen' i ture,* a rule of law which requires that the father's real estate be left to his eldest son, or to the latter's male heirs. The ancient peoples recognized some such procedure, but the term as now used describes a rule that grew out of the military necessities of the feudal period, when it was deemed expedient to strengthen the power of the son first able to bear arms for the king. In England, where it was introduced by the Normans, primogeniture operated only when a person died without making a will. In that case, the eldest son succeeded to the real estate. If the son, likewise, was dead, the property went to his eldest son. Only when the male line was extinct did the property pass to the daughters, who divided it jointly among them except in the case of the Crown, which went to the eldest. The rule, formerly common in Europe, survives chiefly in the English system and in determining succession to the Crown in several European states.

PRIM'ROSE, a low, silvery-leaved, flowering plant which formerly grew wild in English fields but is now a favorite house and garden flower. The primrose seems to have been beloved by many of the poets, for they frequently refer to it; and not only was it popular with them, but the Earl of Beaconsfield, a noted English statesman, chose it as the flower of his party, and women whose husbands were Tories wore it on their hats. The short, central stalk is hidden by a rosette of broad, hair-covered leaves, and the fragrant blossoms, ranging in color from pinkish-yellow to deep purple, grow in clusters on long, separate stems. Besides a variety cultivated as house plants, there are among other species the *cowslip,* a native of European mountain slopes, and the *evening primrose,* both growing wild, the latter blooming at dusk.

A primrose by a river's brim
A yellow primrose was to him,
And it was nothing more.
—Wordsworth: *Peter Bell.*

PRINCE, *printz,* a royal or honorable title, derived from a Latin word meaning *first.* The Latin historians used the word to describe the civil chiefs of the German tribes. It was the chiefs (*principes*) of the allied Latin tribes that constituted, in its first stage, the Roman Senate. In the first council, or parliament, of William the Conqueror (see William I), the earls and barons were called the princes of his realm. As time passed, the title of prince came to have several meanings, but they all trace back to the first use of the word.

On the continent of Europe the title is still employed with its old meaning; the families using it are eminent, among the first families of the land, but they are not connected with the reigning family, nor do they exercise sovereign powers. In England, in the strict language of heraldry, which faithfully reflects early customs, some of the classes of peers are still entitled to the old address of prince, but practically its use is restricted to members of the royal family; even in their case, with the exception of the Prince of Wales, it is a courtesy title, not one of right; they are and remain commoners, unless raised to the peerage by the Crown. See Prince of Wales; Nobility.

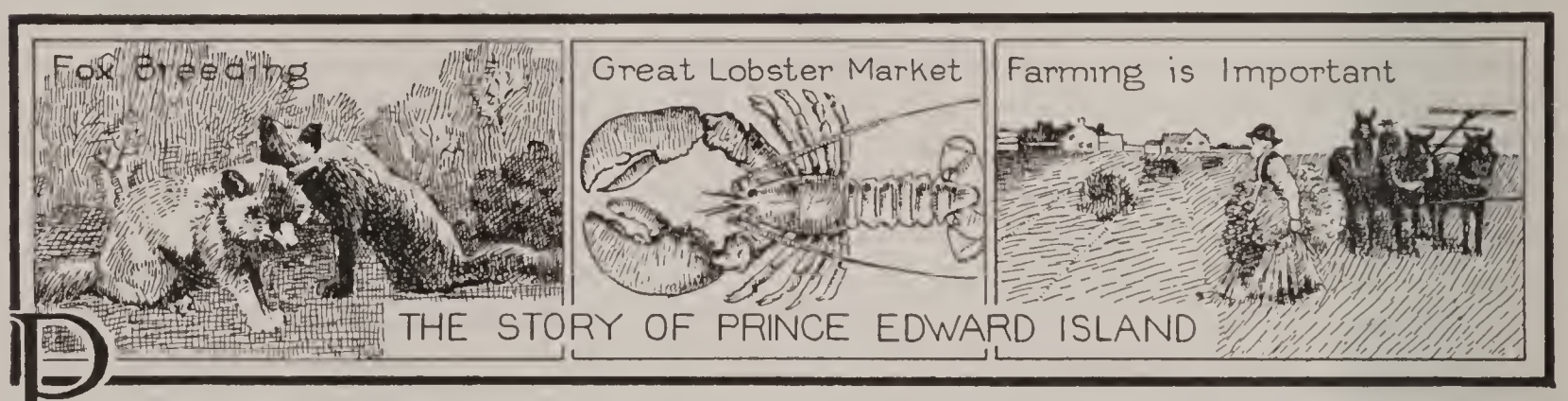
PRINCE ALBERT, popularly known as Electric Prince Albert and as the White Cool City, is a city in Saskatchewan, slightly south of the geographical center of the province. It is situated on the North Saskatche-

wan River, about thirty-five miles west of its junction with the South Saskatchewan. There is both passenger and freight service between Prince Albert and Edmonton, but navigation below Prince Albert is impeded by La Colle Falls, twenty-six miles away. The completion of a lock and dam at this point will permit river traffic between the city and Lake Winnipeg.

The falls are also soon to be harnessed for the development of electrical power, to secure which the city is spending $1,000,000; the work was about half done in 1917; further construction was suspended on account of the war in Europe. Prince Albert is served by four branches of the Canadian Northern Railway and by one branch of the Grand Trunk Pacific (completed in 1917). It is 247 miles north of Regina, eighty-nine miles north of Saskatoon and 605 miles northwest of Winnipeg. Population in 1911, 6,254; in 1921, 7,558.

Prince Albert is a center of Saskatchewan's lumber industry; its lumberyards cut about 50,000,000 board feet a year. It is also the principal point for the shipment of furs and fish of Northern Saskatchewan, and distributes supplies to the Hudson's Bay Company's posts in the north. One of the city's most important industrial plants is a creamery, and worthy of special mention are flour mills, brickyards, cold-storage plants, a slaughterhouse and a boat factory. Prince Albert is also a governmental center, for it is the seat of a district court, is the district headquarters for Central and Northern Saskatchewan for the Royal Northwest Mounted Police, and has a customs office, a Dominion lands office and the provincial jail and penitentiary.

Conspicuous among the buildings are the post office, armory, permanent land-show building, labor temple, ladies' college, Victoria Hospital (public), Holy Family Hospital (private), Roman Catholic cathedral and Anglican pro-cathedral. Prince Albert is the seat of a Roman Catholic and an Anglican bishop. The city owns and operates its electric-light and waterworks plants. It was founded in 1885, and was incorporated in 1904. J.C,K.



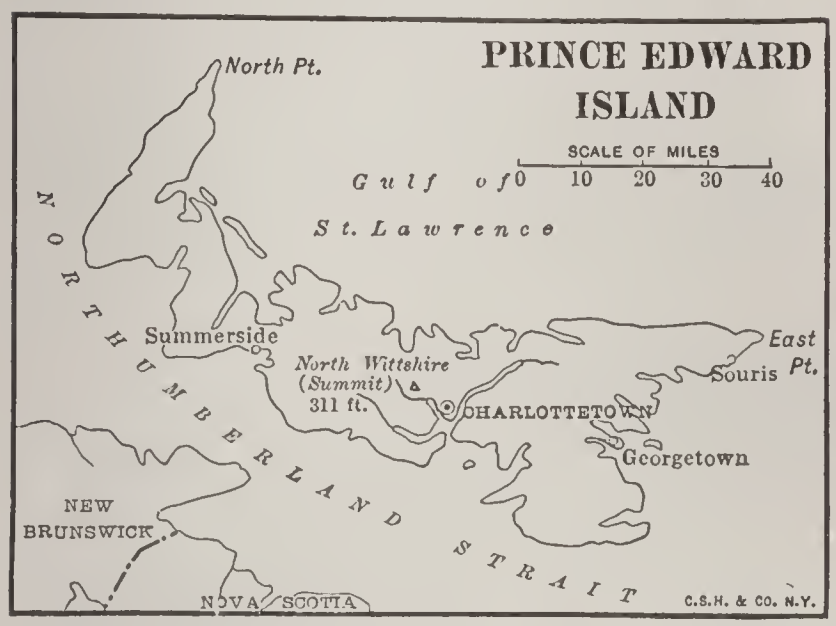
PRINCE EDWARD ISLAND, an island and the smallest province of the Dominion of Canada. It lies in the southern part of the Gulf of Saint Lawrence, sheltered on three sides by Cape Breton Island and the mainland of Nova Scotia and New Brunswick. Separating the island from the mainland is Northumberland Strait, which varies in width from nine to thirty miles. The island is irregular in shape, although its shores are roughly parallel to those of the mainland, and its coast line is broken by hundreds of bays, inlets and projections. For the most part the coasts are low and sandy, the red sandstone of which the island is formed being easily worn by wind and water. Especially on the north shore are fine beaches, but on the south are occasional low sandstone cliffs.

So deep are the indentations of the shore that they divide the island into three equal, almost separate, parts. At high tide there is only a mile of dry land between Bedeque Bay on the south and Richmond Bay on the north, and there is only about a mile and a half between the head of Hillsborough River on the south and Savage Harbour on the north. North of Summerside the land nowhere rises above 175 feet, but in the central third, between Summerside and Charlottetown, are hills over 300 feet high. East of Charlottetown the land is again low and level. The island is 145 miles long, and has an average width of thirty miles. Its area is 2,184 square miles. This is about two-thirds the size of its neighbor, Cape Breton Island, and is one-twelve-hundredth part of the Dominion.

The Forests. Although the weather is much less foggy than on Cape Breton Island or on the adjoining mainland, Prince Edward Island has abundant moisture for vegetation. At one time the entire island was covered with forests, of which between one-third and one-fourth remain. Birch, beech, maple, cedar, spruce and

pine are the chief species of trees. With an abundance of timber the province naturally turned to shipbuilding, but after 1880 this industry declined and has since almost disappeared. Timber is still cut in considerable quantities, but is put to less picturesque uses.

The Soil and Its Products. It is noteworthy that ninety-five per cent of the 15,000 farmers in the province own their farms. As soon as land was cleared the early settlers began to cultivate the soil. Practically the entire island,



OUTLINE MAP

Showing boundaries, chief cities and the highest point of land in the province.

except certain areas of swampy land, is suitable for cultivation. The soil, a light loam, is covered in most places by a layer of decayed vegetable matter, and itself rests on clay and sandstone. As the settlers for generations drew out of the soil all they could, and replaced little or nothing, in time large sections showed signs of exhaustion, from which agriculture has not yet fully recovered. The fertilizer now in general use is called "mussel mud," and is dredged from river beds and bays on the island. Oats, potatoes and turnips are the leading crops; the yearly yield of oats and potatoes is from six to eight million bushels each, and of turnips about four to five million bushels. Some wheat is raised, but only enough for local purposes.

Hogs and cattle are raised in the province in considerable numbers, but horses constitute two-thirds of the value of the live stock ($8,000,000). Dairy farming is growing in importance, and since about 1890 butter and cheese have been produced on a commercial scale. The first cheese factory was opened in 1892, and the first creamery in 1894. One of Prince Edward Island's industries—fur farming—was unique for a number of years, but has been copied in other provinces and in various parts of the United States. The mainstay of the business is the silver fox. A single silver-fox skin is valued, in normal times, at from $300 to $2,000. The island is said to have about 3,000 silver foxes in captivity, of a capital value of $15,000,000 or more. Other fur-bearing animals, including the beaver, mink, muskrat and skunk, are also being raised for their fur.

The Fisheries. Although relatively a small part of the Dominion's fisheries, the Prince Edward Island fisheries are of great value in proportion to the population of the province.

Research Questions on Prince Edward Island

(An Outline suitable for Prince Edward Island will be found with the article "Province.")

When did this province have its largest population?

How did the opening up of regions far to the west affect this eastern province?

How does Prince Edward Island rank among the provinces of the Dominion as to area? As to population?

What is the average density of population? How does this compare with that of the Dominion as a whole? With that of the other provinces?

Why are there few steep cliffs on the shore line?

How long would it take a man walking at the rate of a mile in fifteen minutes to cross the island at its narrowest point?

How does the smallest province of the Dominion compare in area with the smallest state in the United States? How do the two compare in number of inhabitants? In density of population?

How many provinces the size of Prince Edward Island would it take to make a Dominion as large as Canada?

What climatic advantage has the island over the neighboring island and mainland?

In a representative gathering of 1,000 Prince Edward Island farmers, how many, on an average, would own their own farms?

Why did large portions of the agricultural land become exhausted?

What interesting industry, now practiced in some of the other provinces, was for years confined to Prince Edward Island?

How large a percentage of the population is engaged in fishing? In farming?

What is "mussel mud," and for what is it used?

How many houses are there in the legislative assembly? How many of the provinces resemble Prince Edward Island in this respect?

Who was the first white man who visited the island? What did he think it was?

What did the French call the island? In whose honor was the present name given?

How long had the Dominion of Canada existed before Prince Edward Island became part of it?

Nearly 6,000 people are employed in the industry, and the annual catch is worth from $1,000,000 to $1,500,000. Lobster averages sixty per cent of the value of the total catch; other important fishes are cod, herring, oysters, smelts and mackerel. The packing or preserving of fish is an important branch of industry; in fact, with the exception of the manufacture of dairy products, including condensed milk, it is the only manufacturing industry of prime importance.

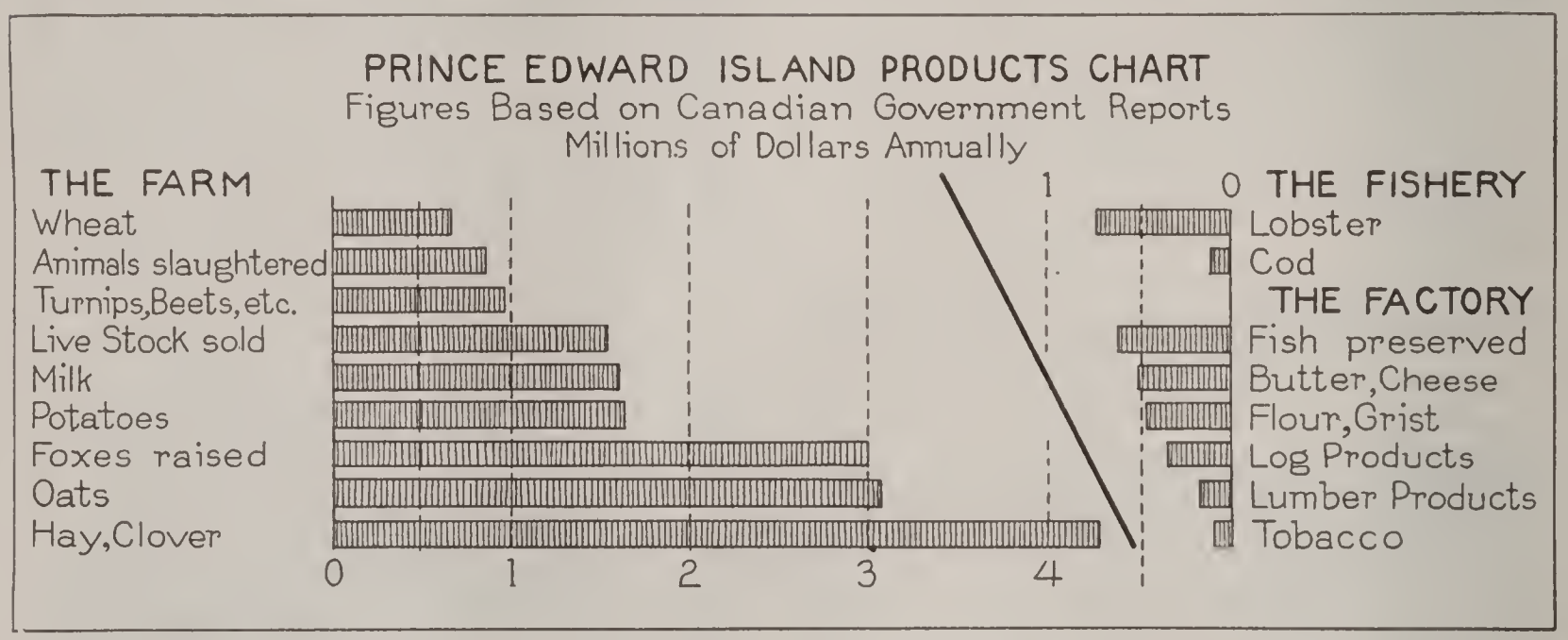
Education and Government. The public school system of the province was established in 1851; since that date elementary education has been free. The schools are under the direction of a superintendent and council appointed by the provincial government. There are two colleges: Prince of Wales College, the head of the public school system, and Saint Dunstan's College, a Roman Catholic institution. Both are at Charlottetown, and both are really advanced preparatory schools rather than colleges of standard grade. Of the latter there are none in the island.

Prince Edward Island, like the other Canadian provinces, has as the titular head of its government the lieutenant-governor, who is appointed by the Governor-General in Council. The legislative assembly is composed of a single house of thirty members. The province is divided into three counties—Prince, Queens and Kings—of nearly equal size. The county towns are respectively Summerside, Charlottetown and Souris. The two former are incorporated towns, but practically all other local affairs are under the direction of the provincial assembly. When Prince Edward Island entered the Confederation in 1873 it was allowed six members in the House of Commons; this number was reduced to five in 1901.

The People. Prince Edward Island, like the other Maritime Provinces, has suffered from heavy emigration to the Canadian Northwest. In fact, in the decades from 1901 to 1921 the population of the province decreased from 103,259 to 88,536. In 1891 the population was 109,000, the highest it has ever been. The density of population per square mile (40.53 in 1921) and the average number of persons to a family, 5.51, are greater than those of any other province. Most of the people are of British descent, but there are a few descendants of French Acadians and United Empire Loyalists.

History. It is possible that the island was seen by Cabot in 1497, but the first white man known to have visited it was Jacques Cartier, the French explorer, in 1534. Cartier, however, thought it a part of the mainland. In 1603 Champlain took formal possession of the island for the king of France. Sixty years later, the Company of New France, to whom it had been granted, regranted it to one Captain Doublet, of the French navy, who lost it soon afterward because he failed to bring settlers. After the Peace of Utrecht the French made several attempts to settle it, but in 1758 there were few residents to offer resistance to British occupation after Louisbourg fell. At that time the population of the island was in the neighborhood of 4,000.

In 1763 the island, together with the remainder of French Canada, passed formally under British rule. Four years later it was divided into townships of 20,000 acres each. These were granted in many cases to speculators and other nonresidents who had more or less shadowy claims on the British government's generosity. Thus it happened that Prince Edward Island suffered for a century (until 1876) from absentee landlordism.



Under French rule the island was known for nearly two centuries as *Isle Saint Jean* (Island of Saint John). The name was changed in 1798 to Prince Edward, in honor of the Duke of Kent, father of Queen Victoria, then commanding the British troops in North America. At Charlottetown was held in 1864 the important conference which paved the way for Confederation, but the colony refused to join the Dominion until 1873. The province has long been interested in securing a tunnel under Northumberland Strait from Cape Traverse to the mainland, but the Dominion government has not yet agreed to its construction. The Dominion government does, however, operate the Prince Edward Island Railway as a branch of the Intercolonial Railway. The main line runs from Tignish southeast to Souris, and branches extend to Georgetown, Charlottetown and other points. The size of the Dominion's financial subsidy to the province, the suppression of the liquor traffic and the reduction of the province's representation in Parliament have all been political issues in recent years. W.F.Z.

Consult McAlpine's *Gazetteer of Nova Scotia, New Brunswick, Prince Edward Island and Newfoundland.*

Related Subjects. The reader who is interested in Prince Edward Island will find helpful material in the following articles in these volumes:

Charlottetown	Province
Fur and Fur Trade	Summerside
Georgetown	

PRINCE GEORGE, a city in the Cariboo district, in Central British Columbia, at the junction of the Nechako and Fraser rivers. It is a divisional point on the Grand Trunk Pacific Railway, and is destined to have the same distinction on the Pacific Great Eastern, the railway which is being constructed from Vancouver to the Peace River Country. The Nechako and Fraser rivers are both navigable for considerable distances; the total length of navigable waterways which can be reached from the city is about 1,100 miles. Before the completion of the Grand Trunk Pacific there was only a trading-post, Fort George, at the junction of the two rivers, but in 1915 Prince George was laid out and incorporated as a city. Population in 1921, 2,053.

Prince George's location, at the junction of two railways and two navigable rivers, will make it an important distributing point for central and northern British Columbia. Lumber, coal, copper, galena and other minerals are found in the vicinity, and grains and root crops do well. The chief manufacturing establishments are lumber mills and a sash-and-door factory.

PRINCE OF WALES, the title bestowed on the male heir first in line to succession to the throne of Great Britain. He is therefore almost always the eldest son of the king. The title was created in 1301 by Edward I, that king of England who accomplished the conquest of Wales. Tradition has it that when a baby prince was born in one of the castles newly built in Wales by the victorious monarch, he was presented to the Welsh people as a prince "who could not speak English." This story may be a myth, but when the boy was seventeen years old his father formally made him Prince of Wales; he became King Edward II. His son, Edward III, was known as Edward of Windsor, and was never created Prince of Wales. But it has since become an invariable custom to honor the heir to the throne in this way; the title is not hereditary, but must be created for each prince so honored. The title is purely honorary, and no power or authority attaches to it, although Parliament votes a yearly sum for his support.

The present Prince of Wales received his title in June, 1910, less than three months after his father, George V, became king. He toured the world in 1920.

PRINCE RUPERT, a city of British Columbia, and one of the most important ports on the Pacific coast of North America. It is the western terminus of the Grand Trunk Pacific Railway, and has direct steamship connection with Vancouver, Victoria, various ports in Alaska, the United States, Japan and other foreign countries. Prince Rupert is 400 miles nearer Japan than any other port in Canada or in the United States. It is located on the north end of Kaien Island, adjoining the Tsimpsean Peninsula, about 500 miles northwest of Vancouver. The island is seven miles long, and has an area of nearly 12,000 acres, or about eighteen square miles, an ample space for future growth. It lies a short distance north of the mouth of the Skeena River and about thirty-five miles south of the southernmost point of Alaska.

The city was laid out in 1908 by engineers acting jointly for the government and the railway, and was named in honor of the first governor of the Hudson's Bay Company (see RUPERT, PRINCE). The first lot was sold in May, 1909, and the city was incorporated in 1910. A year later the Dominion census gave it a

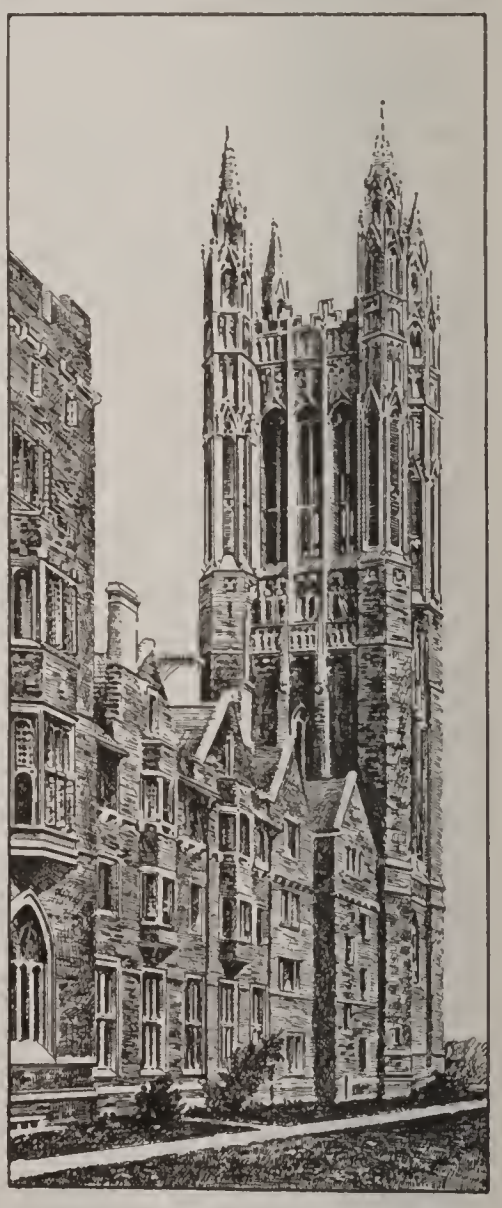
population of 4,184, and in 1921 the Dominion census reported 6,393.

The country surrounding Prince Rupert has almost unlimited agricultural, mineral and forest resources, and the bay and near-by streams abound in fish. The halibut fisheries are perhaps the greatest in British Columbia, and the Skeena River salmon fisheries are second only to those of the Fraser River. Prince Rupert has reaped greater benefits than any other city from the order in council of March 9, 1915, by which American fishermen are allowed to ship their catch in bond from Canadian territory into the United States. The city has the largest cold-storage plant exclusively for fish in the world. Lumber mills and sawmills are also conspicuous, as is the great, floating dry dock, large enough to accommodate 20,000-ton ships, which the Grand Trunk Pacific was completing in 1917 at a cost of $2,500,000. This dry dock is the largest on the Pacific coast. Facilities for shipbuilding are excellent, and it is expected that within a few years this will be a flourishing industry. W.B.

PRINCE'TON, Battle of, an engagement of the American Revolution which revealed the superior generalship of George Washington. It was fought on January 3, 1777. This battle, which resulted in victory for the Americans, was of great strategic importance. On the night of January 2, Lord Cornwallis, in command of a force of about 8,000 men, had taken a position on the west shore of the Assunpink River, a small creek south of Trenton, N. J. Washington, with a much smaller force, was encamped at Trenton. He could not retreat across the Delaware because the river was blocked with ice, so he resolved to take the offensive. Leaving his camp fires burning, he led his army by a brilliant maneuver around the British, and at daybreak arrived on the outskirts of Princeton. Here a detachment marching to join Cornwallis came into conflict with the Americans, and after a brisk engagement, in which Washington revealed splendid personal bravery, the British withdrew, having lost over 300 in killed, wounded and prisoners. Washington then seized the military stores at Princeton and returned to Morristown, where he established winter quarters. This battle, following the important victory at Trenton (see Trenton, Battle of), greatly encouraged the Americans and inspired them to renewed efforts. Another important result was the withdrawal of all the British forces in New Jersey from that state into New York.

PRINCETON, N. J., a borough in Mercer County, situated in the west-central part of the state, ten miles northeast of Trenton, on the Delaware and Raritan Canal and the Pennsylvania Railroad. This fine old residence town is the seat of one of the great American universities (see Princeton University), and it has many interesting historical associations. Here Washington defeated the British in the Battle of Princeton, and in Nassau Hall Congress was in session when the news was brought that England and America had concluded peace. Grover Cleveland spent the last years of his life in Princeton, and he is honored with the Cleveland Memorial Tower, shown below. Besides the university the town has Princeton Theological University, Rockefeller Institute for Medical Research, Princeton Preparatory School and Saint Joseph's College. Population in 1910, 5,136; in 1915, 5,678 (state census).

PRINCETON UNIVERSITY, one of the oldest and most influential universities in the United States. But three American colleges preceded it, Harvard, Yale and William and Mary. The institution is the outgrowth of the College of New Jersey, founded in 1746 at Elizabethtown through the efforts of influential Presbyterians. The first commencement exercises were held in 1748 at Newark, whither the college had been removed the same year. In 1752 it was decided to make Princeton the permanent seat of the institution, and two years later the corner stone of the first building, Nassau Hall, was laid. Sessions were begun at Princeton in the fall of 1756, and 140 years later the corporate title of the school was changed to Princeton Uni-



CLEVELAND MEMORIAL TOWER
It was completed in 1913, and is 273 feet high.

versity. Though it is not a sectarian school, the Presbyterian Church has made generous contributions for the support of the university, and has been influential in shaping its policies. Its government is in the hands of a self-perpetuating board of trustees, of which the governor of New Jersey is ex-officio president. Women are not admitted to any courses.

As now organized the university embraces the academic department, the school of science, the graduate school and the technical departments of civil and electrical engineering. Bachelor's degrees are granted in the academic department and in the school of science, degrees of C. E. and E. E. in the engineering schools, and master's and doctor's degrees in the graduate school, which offers more than 200 courses. In connection with the graduate department is the Graduate College of Residence, where students are accommodated at very moderate rates. The faculty numbers about 220, the student enrolment is over 2,000, and the university library contains about 354,000 volumes. On the beautiful campus of 632 acres is a group of buildings not surpassed by those of any other American university. Princeton has an endowment of about $5,400,000, and its regular annual income approximates $660,000. Among the famous men connected with this institution, as students or presidents, were Jonathan Edwards, James Madison, Philip Freneau, the poet, James McCosh of Queen's College, Belfast, and Woodrow Wilson, president from 1902 to 1910. Grover Cleveland was a lecturer and trustee of the university for ten years. President Wilson was succeeded by John Grier Hibben, when the former became governor of New Jersey.

Consult Williams's *Handbook of Princeton;* Collins's *Princeton.*

PRINTING. The reader of a great city daily, with its store of information and its many advertisements, which may be bought for a penny or two, seldom gives a thought to the wonderful machinery necessary to the production of such a sheet; but when we stand beside one of the great machines which prints, folds and counts these papers at the rate of 65,000 to 90,000 an hour, we are amazed at what inventive genius has accomplished in the perfecting of the printing press. Formerly all the processes connnected with printing required hand labor; to-day but very little hand labor is required.

Processes. Three processes are required in printing—setting the type, or *composition;* arranging the type into pages, or *imposition;* and impressing the type upon the paper, or *printing.*

Composition. Formerly all type was set by hand. The typesetter, known as the *compositor,* stood before a case consisting of two boxes, each divided into a number of compartments equal to the number of characters he used. One case was set back and a little above the other and placed in a slanting position so it could easily be reached. This was called the *upper case,* and it contained the capital letters; the other, known as the *lower case,* contained the small letters. From this arrangement printers came to refer to capitals as "upper case" and small letters as "lower case" letters, and these terms are still used. The compositor picked up the type one at a time and placed them in a frame called a *stick,* which he held in his left hand. The stick held about fifteen lines, and when the stick was filled the type was transferred to a long, narrow, metal frame called the *galley.* When the composition was finished a rough proof of the galleys was taken. The proof was read, the errors marked on the margin and the proof was given to the compositor, who proceeded to correct his work. Hand composition is still used in small, country offices and for setting advertisements, but machine composition has replaced it for all other purposes. See LINOTYPE; MONOTYPE.

Imposition, or Make-up. Whatever the method of composition, the type is first arranged in galleys, and when the galleys have been corrected the next process consists in arranging the pages. This is done on a table with a stone or iron top. Formerly stone was the only material used, and from this fact the workman who made up the pages was known as the *stoneman.* He is also called the *make-up* man. Arranging the pages consists in dividing the type up into sections, each the length of the required page, putting in the headings at the top of the page and inserting the page numbers. The made-up pages are then placed in an iron frame called the *chase.* Their arrangement must be such that when the printed sheet is folded the pages will follow each other in the order in which they are numbered. Since the paper is printed on both sides, this arrangement seems peculiar to one not familiar with printing. The chase, when filled with type pages, becomes the *form.* Pages are printed in multiples of four, and a form for books may contain as many as sixty-four pages, although thirty-two is the number most frequently used. A form contains half the number of pages to

be printed on the sheet. Only small editions of country papers and circulars are now printed directly from the type. Large daily papers are printed from stereotype plates, and books and magazines from electrotypes.

Printing, or Presswork. This process is described in the article PRINTING PRESS, which see.

Color Printing. Some printing presses can print two or more colors at once; the colored parts of the Sunday issues of large city dailies are printed on such presses. This is a cheap process, and the result is seldom pleasing. But books and magazines of high grade are frequently illustrated with prints that are exquisitely colored. The reader often wonders how such beautiful pictures can be made without incurring an expense that would make the price of the book or magazine prohibitive. The process of making these pictures has been developed since the perfection of photography (which see). The colored illustrations in THE WORLD BOOK are a good example of this sort of printing. These beautiful illustrations are made by printing four colors—yellow, red, blue and black—one over the other. Each electroplate is made to print one color, and the impressions of these plates so overlap as to produce the variety of tints required in the picture. The production of such pictures requires very skilful printing, since the impressions must exactly overlie each other. A variation of the minutest fraction of an inch will mar, and may ruin, the picture. Cheaper colored prints of this sort are made with only three colors, the black being omitted.

History. Printing with movable type was invented by Johannes Gutenberg of Germany and Laurens Coster of Holland between 1420 and 1440. It is not positively known which of these inventors was first in the field, but the honor is generally conceded to be Gutenberg's. The Chinese are known to have printed from engraved blocks at least fifty years before the Christian Era. The ancient Egyptians and the Romans also used engraved stones and metal for stamping signatures and other characters upon documents, but real printing is considered to have begun with the invention of movable type. Gutenberg carried on his work at Mainz, Germany, where he formed a partnership with one Fust, or Faust, a jeweler. The first work that came from his press was the Gutenberg Bible. The partners soon quarreled and Gutenberg retired, leaving Faust to carry on the work. From Germany the art spread to Italy, France, Spain and England; William Caxton introduced it into England in 1476.

The first printing press in America was set up in Mexico in 1536. The first press in the United States was established at Harvard College in 1639. The first work printed on this press was the *Freeman's Oath,* but its most famous publication was John Eliot's *Indian Bible,* a few copies of which are still in existence (see ELIOT, JOHN). This was the humble beginning of the great University Press of Boston, one of the largest bookmaking establishments in America.

From these small beginnings printing has grown until it has become one of the world's great industries. The United States is one of the leading countries in printing and publishing, and the value of the annual production of printed matter of every description in 1920 was $1,528 856,500. In the Canadian provinces the industry is rapidly growing.

Consult De Vinne's *Practice of Typography;* Hoe's *Literature of Printing.*

Related Subjects. The reader is referred to the following articles in these volumes:

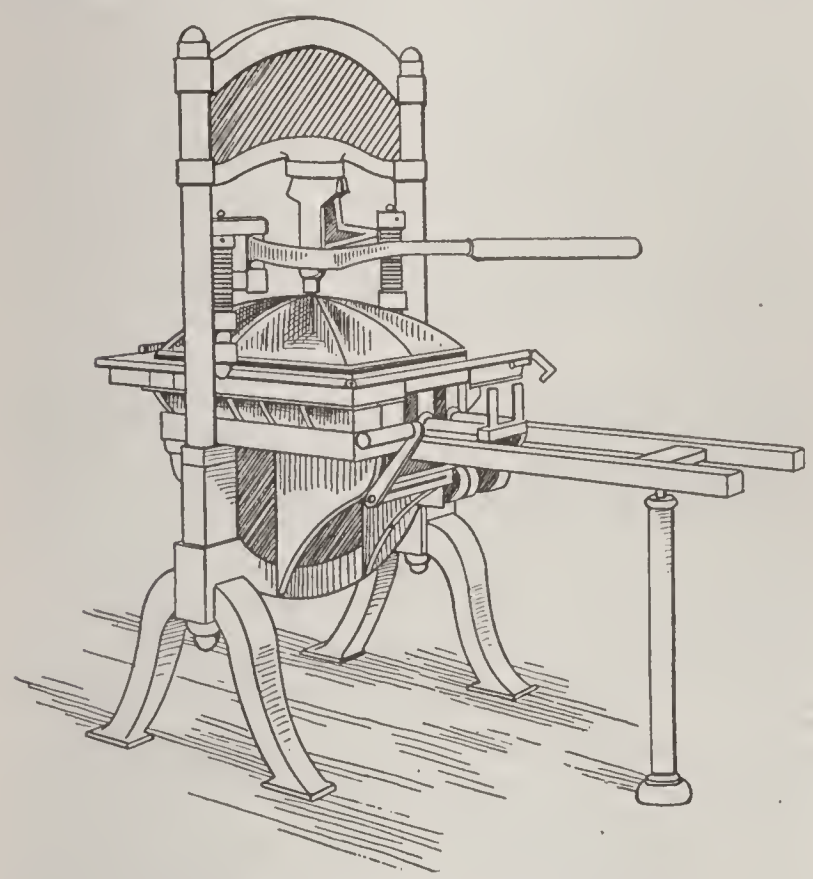
Books and Bookbinding	Lithography
Caxton, William	Newspaper
Electrotyping	Printing Press
Engraving	Stereotyping
Gutenberg, Johannes	Type

PRINTING PRESS, a device for printing upon paper and other material. In none of the mechanical arts except the development of flying machines have improvements been more rapid since 1800. Except in the purpose for which it is intended there seems to be little relation between the ingenious but cumbersome hand presses of the fifteenth century and the huge, modern power-driven presses. In the early days of printing the production of a single printed sheet required eleven operations, all performed by hand.

The Earliest Presses. The first press was an adaptation of the medieval cheese press, still common in many parts of Europe, consisting of a bed on which the cheese was placed and above it a square block which was screwed down by means of a lever inserted in a hole in a wooden screw. The printing press of the fifteenth century, built of wood, was exactly the same. In place of cheese a *form* of type or of engraved blocks of wood was laid on the *bed* of the press. The ink was applied to the type by a leather-covered inking ball, usually stuffed with wool. A sheet of dampened paper was then carefully laid on the form, and the wooden block, or *platen,* was screwed down so

that the paper received a clear impression of the type. This rough press produced one sheet at a time, printed poorly, and only on one side. At that time it was regarded as a marvelous triumph.

Evolution of the Printing Press. Early in the seventeenth century a number of important changes were made in the style of the printing press by William Blaen (1571-1638), a famous Dutch printer. In Blaen's press the



"WASHINGTON" HAND PRESS

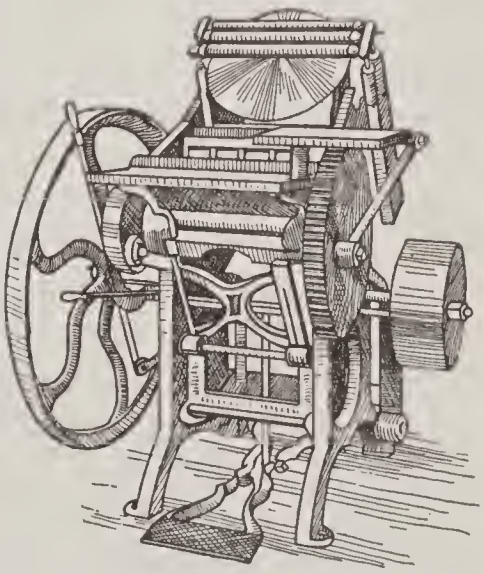
Hundreds of country newspapers are yet printed on this style of printing press. It is capable of doing a fair grade of work and is an inexpensive machine. To it was due the rapid increase in the number of newspapers in small villages.

spindle of the screw was put through a square block, which was guided or held in place by the frame of the press. This block, from which the platen was hung by cords or chains, gave a more nearly rigid platen. An ingenious sliding arrangement was added by which the type form on the bed was moved back and forth under the platen. Blaen also used a new kind of lever to turn the screw which raised and lowered the platen. These improvements were really matters of detail, not of principle.

For nearly two centuries more these wooden presses, essentially the same as those which Gutenberg and the other early printers had used, remained in general use. In 1804 Charles, third Earl of Stanhope (1753-1816), invented an iron press which met with great favor and is still used by a few printers. The chief advantage of this press, aside from the material used, was that greater power was obtained at less expenditure of labor by enlarging the screw and changing the position and form of the lever. The Albion press, a development of the Stanhope, was used by the Kelmscott Press of William Morris, and is still used in England for fine printing. A similar press used in the rural districts of the United States and Canada is the Washington (see illustration). The average output of these modern hand presses is from 300 to 400 impressions per hour, and the largest sheet printed by them is about thirty-six by forty-eight inches.

Power Presses. The first practical press not operated by hand was invented by a German, Friedrich König (1774-1833). His invention of the cylinder press in 1806 marks a new era in printing. The machine took its name from the large cylinder which constituted the platen. As the cylinder revolved it drew with it the paper, which then received the impression of the type. Two of these presses were purchased by the London *Times,* and that newspaper was printed by steam power at the rate of 1,100 impressions an hour, to the amazement of Britons. Other inventors, in all parts of the world, have applied their genius to the development of the press, with the result that there are to-day perhaps half a dozen distinct types of power presses.

The Job Press, or Small Platen Machine. A typical and the most successful small press is the Gordon, shown in the illustration. In this form the old hand lever is displaced by a rotary power wheel which can be driven by a belt or by the pressure of the operator's foot on the treadle. The only labor needed is that of a boy or girl to feed the sheets and remove them. Adjustable pins on the platen hold the paper in place. Such a press is especially economical for letterheads, cards, and small, single sheets of any kind, up to twelve by nineteen inches in size, and has a capacity of 750 to 1,000 impressions an hour.

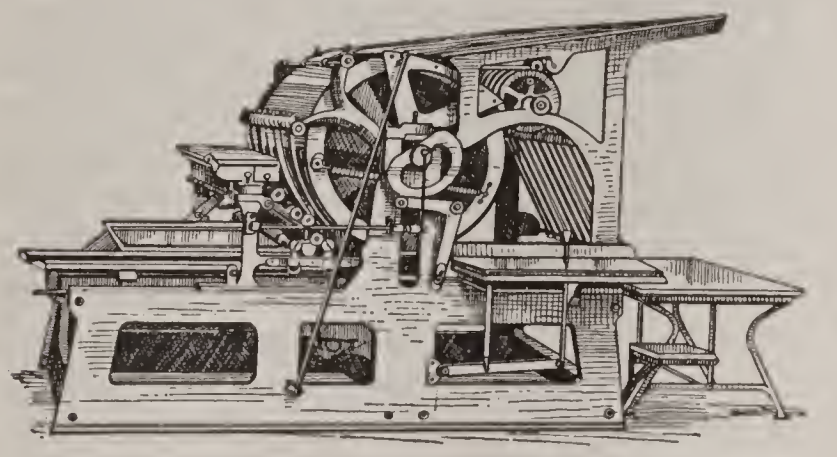


"GORDON" JOB PRINTING PRESS

Cylinder Presses. The simplest of these prints on one side only, but it is a highly-satisfactory machine. It makes one impression to one revolution of its single cylinder. The type bed moves forward and backward on rollers or

runners of steel. While the bed moves backward from the cylinder, the latter is held by a cam, while automatic fingers seize the printed sheet and carry it over a second but smaller cylinder, from which it glides to the "flyer" and is deposited on the table. Highly-perfected single-cylinder presses are used for fine book printing.

A further advance was the *perfecting press,* which had two cylinders and two type beds, and printed both sides of a sheet, but with two distinct operations. The sheet on such a press



POWER PRINTING PRESS
A standard machine for newspaper printing in small cities.

is carried over several rollers from one cylinder to the other. The perfecting machines have been supplanted by the so-called *two-revolution presses.* These have only one cylinder, which revolves twice for each sheet printed. The use of this press means that the sheet must be run through twice if it is to be printed on both sides, but the modern two-revolution presses have been perfected so that it is cheaper to use them than the old two-cylinder presses. A good press of this type can be purchased for $2,500 to $3,500, depending on size and special attachments.

Daily Newspaper Presses. To the ordinary visitor in the pressroom of a great daily newspaper, where the huge machines turn out a whole edition of a paper in an hour or less, it is surprising to note that apparently no one is paying the slightest attention to the printing. The machines keep up a continuous roar; engineers, oil can in hand, stroll around, oiling here, examining there, much as engineers on board ship would do. Yet from the bowels of the huge machine they tend is pouring a stream of miles and miles of news and illustrations vitally affecting the knowledge and welfare of the world. The human brain controls the mighty machinery of a newspaper; human hands are rarely needed.

One of the most remarkable of modern presses is known as Hoe's Double Octuple Rotary Machine, printing from eight reels of paper, each containing a roll five miles in length and double the width of the ordinary newspaper. This press prints, cuts, folds and delivers in quires, at the rate of 96,000 copies an hour, a complete newspaper of thirty-two pages. The working of the machinery is so rapid that when the press is running at full speed the paper is unwound at the rate of ten miles an hour. Such a machine in octuple form costs about $90,000, measures fifty-four feet in length, nineteen in height and twelve in breadth. When all the paper on the reels is unwound and printed, a new set of eight reels can be adjusted ready for printing in three minutes. These presses may also be adapted for color printing (see PRINTING, subhead *Color Printing.*

The principle on which all rotary presses are built is the same. The basic idea is that the type, in the form of stereotype plates, is fastened to the large cylinder, while smaller cylinders carry the paper. Ingenious combinations of cylinders are arranged so that both sides of the paper are printed at once; the paper is fed into the machine from the continuous roll or web about 25,000 feet long, and the printed web is cut into the proper lengths and folded into newspaper form by a series of knives and rollers. On these large cylinder presses only stereotype plates are used. The octuple rotary press described above is really a combination of eight separate presses in a single frame; any of them or any combination of them may be run alone. W.F.Z.

Consult DeVinne's *Invention of Printing;* Hoe's *Short History of the Printing Press.*

Related Subjects. See list at end of the article PRINTING.

PRISM, *priz'm.* A solid which has two equal and parallel polygons for its bases and parallelograms for its lateral surfaces is a *prism.* A prism whose lateral faces are perpendicular to the base is a *right prism;* the lateral faces are rectangles. All of the prisms shown in Fig. 1 are right prisms. Other prisms are called *oblique;* their lateral surfaces are parallelograms but not rectangles. Prisms are named from their bases; as *triangular, a, rectangular, b, pentagonal, c,* etc. (see in Fig. 1). The *altitude* of a prism is the perpendicular distance between the bases.

The *lateral surface* is made up of a number of parallelograms, a number equal to the number of the sides of the base. Therefore *the area of the lateral surface is found by multi-*

plying the perimeter of the base by the altitude.

The volume of a prism is found by multiplying the area of the base by the altitude.

Problems. 1. What is the entire surface of a

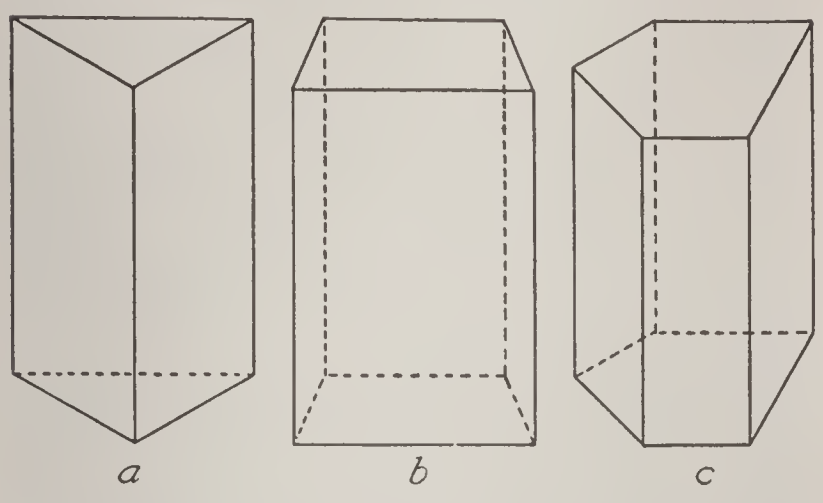


FIG. 1

Explanation of the three figures appears in the text.

prism whose base is 2 inches square and whose altitude is 6 inches?

Lateral area in sq. in. $= (4 \times 2) \times 6 = 48$
Area of bases in sq. in. $= 2 \times (2 \times 2) = 8$
Entire surface in sq. in. $= 56$

2. What is the volume of a triangular prism 20 inches high, whose base is a right triangle with a base of 12 inches and an altitude of 8 inches?

Area of base in sq. in. $= 12 \times 8/2 = 48$
Volume in cu. in. $= 48 \times 20 = 960$

3. What is the volume of a prism whose altitude is 15 feet and whose base is a regular hexagon 2 feet on each side?

Solution: (1) See base as a regular hexagon divided into six equal triangles. (2) Draw altitude of one of these triangles, dividing the triangle into two right triangles. (3) We have base and hypotenuse of right triangle, to find altitude.

(4) Base $= 1$ ft.
Hypotenuse $= 2$ ft.
$H^2 = B^2 + A^2$
$2^2 = 1^2 + A^2$
$3 = A^2$
$\sqrt{3} = A$
$1.73+ = A$

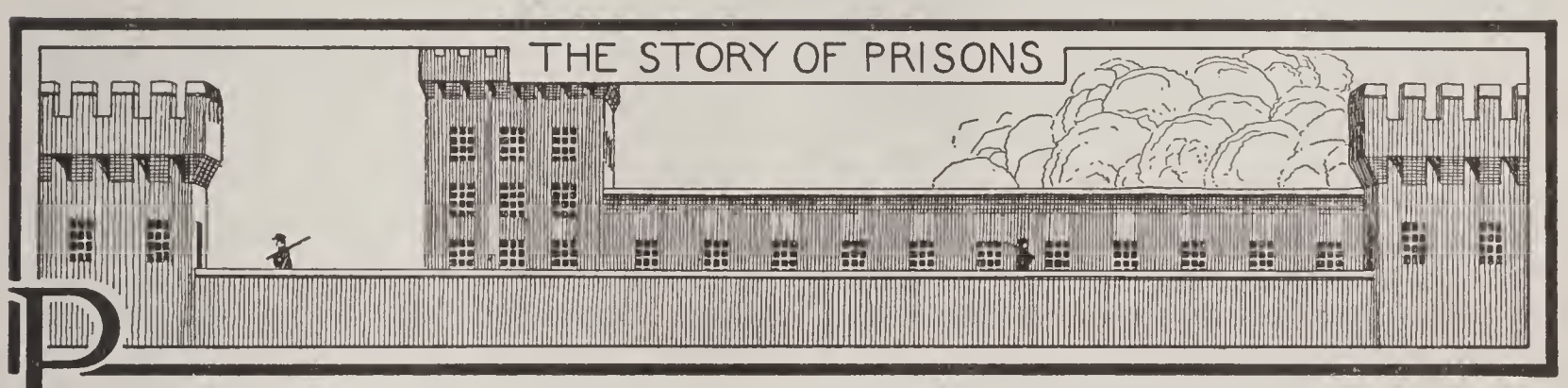
(5) Area of hexagon in sq. ft. $= (6 \times 2) \times 1.73 = 20.76$

(6) Volume of prism in cu. ft. $= 15 \times 20.76 = 311.40$

4. What is the lateral area of a silo built in the shape of a hexagonal prism 30 feet high, each side of the base being 6 feet 8 inches long?

Lateral area in sq. ft. $= (6 \times 6\frac{2}{3}) \times 30 = 1200.$

A.H.



PRISON, *priz'n.* The word *prison* reached its English form through the Latin and the French languages. Originally it meant *to lay hold of,* or *to seize;* a prison, therefore, was any place where persons were held in safe custody after arrest. There was no distinction between jails and penitentiary. To-day a jail is a purely local institution, maintained for the temporary safe-keeping of a person accused of crime until his guilt or innocence is established, and as a place of imprisonment for those convicted of petty offenses who are sentenced to a few days' or a few months' detention.

A prison, or penitentiary, is not a town, city or county institution, but is a part of the machinery of government of a state or province. It is not a place for detention of petty offenders or youthful criminals, but for the imprisonment of adults, both male and female, who have been found guilty of serious offenses against society and who have been sentenced for periods varying from one year to the remainder of their lives. In jails short-term prisoners are maintained in idleness; in prisons labor is provided, and each inmate works at a productive task, under strict discipline.

Management. Every state prison is in immediate charge of a *warden,* who nearly always receives his appointment from the chief executive of the state or province; in a few instances a board of prison control assumes this responsibility. Until within recent years wardens were appointed largely as rewards for political activity, regardless of fitness; this rule yet holds in some parts of America, but the awakening consciousness of the people is bringing about a notable reform. Fewer incompetent wardens are now in charge of prisons than ever before; men who have made prisons a subject of long study are being placed in these important posts,

and scientific management is changing the character of many institutions.

Under the warden are numerous *guards,* who are armed officers, charged with the task of maintaining order and enforcing discipline. Where these officials are political appointees the quality of service is apt to be low, but under civil service appointment their conduct is usually praiseworthy. It is vital that they be loyal to the warden and that they follow his guidance implicitly. There is a prison *chaplain,* appointed by the governor or by the warden; his work is of vast importance, and frequently more far-reaching in its effect than the coercive regulations of the institution.

Equipment. Every prison has its large number of cell rooms, constructed tier upon tier and built of concrete and iron. Some are extremely insanitary and have been condemned by every investigating authority. As new prisons are built construction defects are remedied; the most modern idea tends to the cottage plan for prisoners, but this requires a large area for the entire prison plant. There is always a prison library, usually well-stocked; a chapel, for church services and for entertainments; a barber shop; a laundry, and a fairly large, open space for athletic contests, open at specified times to prisoners whose conduct is exemplary.

Occupations of Prisoners. If idleness is the greatest vice of free men, it is the worst possible condition under which men in prison can live. Labor is enforced in every penal institution. Each man is given work, if possible, similar to his occupation when he was "outside;" when this cannot be done he is assigned to a department where he can be most useful. In some prisons the men are paid a small sum for their work; in others, they are paid for overtime only. Occasionally after regular hours inmates are permitted to work at any chosen private task and thus earn money. All earnings are either held to the credit of prisoners by the warden or are sent to families or other relations, as may be requested.

In some prisons what is known as the convict labor system is in force. It is explained in the article Convict Labor, on page 1564.

Prison Reform. It is difficult to imagine the horror of solitary confinement in a poorly-lighted, ill-ventilated, concrete cell, where the prisoner can see no person save a guard and is forbidden to speak even to him. Such was once the conception of what prisons and punishment should be. When it was found that such places were becoming madhouses, reforms slowly appeared. Work was given the victim in his solitude, but even this mental stimulus did not prevent madness. It was at length realized that man, a social being, must have at least some degree of intercourse with his fellow men. The workshop was introduced, and prisoners worked together, under orders not to hold communication with one another. This strict rule is yet in effect in most prisons, but its enforcement is difficult; prisoners shrewdly arrange codes and signals, and use them even under the eyes of guards, so ingenious are some of them.

Well-behaved prisoners in the better class of institutions are given privileges which enlarge their freedom of movement, extend to them certain conversational privileges and in general put them on their honor. These are termed *trusties,* and few thus favored fail to meet the expectations of officials. Prison farms are frequently established, and on these trusted prisoners live and enjoy a good degree of freedom. Another recent departure from the iron rule of prison management is the organization of prison camps, to which are assigned trusted prisoners, to construct public roads. Cases are known in which 150 prisoners have occupied such camps, with fewer than half a dozen guards to watch them. Betrayal of confidence in such cases is rare.

Among the American prisons in which reforms have raised the standards of conduct and of living are the state penitentiaries of Colorado, Oregon and New York (Elmira). Illinois attempted to enlarge upon the honor system, and for a year or more succeeded fairly well; but abuses arose from various sources and these culminated in a serious riot in June, 1917, which required two companies of militia and an entire city's fire and police department to quell.

Punishment for the crime of the prisoner is the foremost consideration in securing the ends of justice, but the era has arrived which marks him as a man worth reforming and remaking into a good citizen. There are, perhaps, not more than twenty men in America who have succeeded in instituting helpful and beneficial reforms of a permanent nature into prison management. Many others have sincerely tried, but their institutions have not been organized with the necessary freedom from political manipulation, and they have failed. J.L.W.

Consult Potts's *Some Practical Problems of Prison Reform;* Osborne's *Within Prison Walls;* Ives's *History of Penal Methods.*

Related Subjects. The reader is referred to the following articles in these volumes:

Convict Labor	Juvenile Court
Crime	Parole
Indeterminate Sentence	Sociology

PRISONERS OF WAR, those soldiers or naval men who have been captured while enlisted under the banner of a country at war with another state. It is not necessary that they be actively engaged in fighting; if they are engaged in any capacity with an army, as guides, sutlers or electricians, they are liable to capture, though surgeons and chaplains are usually exempt from seizure; any man in the naval service is also liable to seizure as a prisoner of war, with the same exceptions.

In ancient times, prisoners were treated with great cruelty. An Assyrian inscription speaks of crucifying 3,000 such unfortunates. But as civilization advanced higher ideals slowly developed, until at present, among all enlightened nations, they are treated even more considerately than are prisoners in civil life. According to a convention of the Peace Conference at The Hague in 1907, they are simply in the custody of the nation that captures them, and while confined, are to be treated as well as their own soldiers. They may be put to work, but the work must not be extremely arduous, or such as the soldiers of the power holding them would not be expected to perform. They are to be paid for their labor, and the money earned is applied to their necessities. Officers are to receive the same pay that was allowed them by their home government. Their private correspondence, should they be allowed to write, is passed through the mails free. The captors have the right to prevent any prisoner from communicating with anyone whomsoever, and of reading all correspondence sent or received by prisoners.

Conditions in the field are different from those laid down on paper at The Hague. Prisoners of war are now usually given only such work as may be necessary. They must fetch and carry their own food, help to build their own barracks or prison, cut their own firewood, attend to the cleanliness of their quarters and may be employed on any necessary work of a nonmilitary character. If a person tries to escape he may be shot; if caught, he may be disciplined. If, however, he succeeds in escaping, rejoins his own forces and is again captured, he cannot be punished for his previous offense. The modern prisoner of war has to make himself useful.

In the War of the Nations, which began in 1914, many stories were circulated to the effect that some of the warring nations treated their prisoners of war very harshly. It is true that the number of prisoners held by all the warring nations exceeded a hundred times or more the total number taken in any previous war in history. The care of them imposed a very heavy burden, and it is probable that there was more suffering among the captives than had ever before been recorded, from causes not always possible to remedy. C.H.H.

PRIVATEER, *pri va teer'*. When two nations are at war with each other, the commerce of one is subject to attack from the other. In early times, it was the custom for hostile nations to commission privately-owned ships of a neutral nation to assist them in war on the ocean commerce of their enemy. Such commissions were known as *letters of marque,* and ships acting under them were called *privateers.* But this practice was open to great abuse, and was contrary to the developing sense of justice among all peoples. Accordingly, a conference at Paris in 1856, attended by representatives of the leading nations, declared that privateering should be abandoned. The United States did not sign this convention, but it was simply on the ground that its terms were not wide enough; that it accepted the principle as right was shown in its declaration of war against Spain in 1898, when it was announced that privateering would not be permitted. The navies of the nations are now the only instruments of offense and defense on the high seas. See NAVY.

See Maclay's *History of American Privateers.*

PRIVY, *priv'i,* COUNCIL, in Great Britain, a council appointed by the sovereign, its original function being to advise him on matters of state. Its beginning can be traced to the council of William the Conqueror. In subsequent centuries, as Parliament increased its power, the importance of the Privy Council decreased. The contest between Parliament, which claimed sole power to legislate, and the Crown, which claimed power to legislate through the Privy Council, was definitely settled only by the Bill of Rights in 1689.

The Cabinet of Great Britain is a development of the Privy Council; that is to say, the former began as a select few of the larger council, whom the king especially trusted. The Privy Council at present, besides the Cabinet, is composed of a large number of eminent per-

sons, such as retired ambassadors, judges and distinguished scholars, selected from all parts of Great Britain and its dependencies. For many of them it is simply a title of great honor, for a privy councilor, as such, receives no salary; it is only when called to a place in the Cabinet that he becomes a salaried official. Members of the Council are appointed for the life of the sovereign who names them, and for six months after the ruler's death, unless for some cause stricken from the roll. The full Council seldom meets except at the beginning of a new reign or when the reigning sovereign announces his or her marriage.

A member of the Privy Council prefixes the title Right Honorable to his name and follows the name with the suffix P. C. (Privy Councillor); this latter title precedes any other with which the member may have been honored.

The Cabinet of the Dominion of Canada is called His Majesty's Privy Council for Canada, but only such of its members as have been so appointed belong to the Privy Council of the Empire.

Consult Wheeler's *Privy Council Law;* Baldwin's *Acts of the Privy Council* (New Series).

PRIVY SEAL, one of the official seals used on public documents in Great Britain. It is intermediate in character between the signet seal, that is, the seal used as the signature of the sovereign, and the Great Seal, or the seal used on all public acts of state which concern the United Kingdom. The privy seal was used to authorize the issue of money from the exchequer, to authenticate documents to the Keeper of the Great Seal, thus authorizing him to affix the latter, and it served to authenticate documents of minor importance. Since 1884 its use has been discontinued, but the office of Keeper of the Privy Seal still exists. He is the fifth officer of state, and is usually a temporal lord and a member of the Cabinet.

PRIZE FIGHTING means fighting with fists, either bare or with gloves, for a prize or reward. In modern times it is peculiarly an Anglo-Saxon sport, but ages ago it was practiced by other nations, especially the Greeks and Romans. After the fall of Rome, however, boxing seems to have died out except in England, where professional fighters were known throughout the Middle Ages. Modern prize fighting begins with James Figg, a fighter who defeated all comers in England from 1719 to 1730. One of his successors was Jack Broughton, who made boxing a national sport. He first used gloves, but only in practice. All prize fights were fought with bare knuckles until more than a century later. The last great prize fight of this old style was fought between Tom Sayers, the English champion, and J. C. Heenan, the American champion, in 1860. These fights were so brutal that public opinion finally called a halt.

Prize fights to-day are conducted under the regular rules for boxing (which see). They lack the brutality and the trickery and cheating which characterized the bare-fist fights of an earlier day, but the majority of people regard them as degrading exhibitions. Some states forbid prize fights, or public boxing exhibitions of any kind; some allow "sparring matches," but not for prize money; in a few states only are there no restrictions.

World's Championships. The first recognized world's champion was Tom Sayers, an Englishman, who left the field open on his retirement in 1860. Ten years later another Englishman, Jem Mace, defeated J. Allen, an American. The world's championship fell to Jake Kilrain of Boston in 1887. The champions since Kilrain's day, with the dates of their supremacy, follow: John L. Sullivan, an American, 1889-1892; James J. Corbett, an American, 1892-1897; Robert Fitzsimmons, an Australian, 1897-1900; James J. Jeffries, an American, 1900-1910; Jack Johnson, an American negro, 1910-1915. Johnson's personal character, unlike that of most of his predecessors, was not of a kind to win admiration, and the lovers of the sport generally rejoiced at his defeat on April 5, 1915, by Jess Willard, an American. In 1919 Jack Dempsey defeated Willard.

PROBATE, *pro'bayt,* the proof before a proper court that an instrument offered to be proved or registered is the last will and testament of a deceased person. It is the duty of the person or persons named as executors to offer the will for probate, and the instrument should be presented as soon as possible after the death of the testator (the person leaving the will). Separate courts are maintained for this purpose in most states and provinces, and are known as surrogate's, or probate, courts. A *citation,* or notice, is issued, when the will is offered for probate, to all the heirs who would have taken the property if no will had been made. On the return of the citation, or the day mentioned, the parties cited may appear and object to the probate of the will on various grounds. A date for hearing is then fixed by the probate judge, and the examination of witnesses proceeds as in any civil action.

If no objections are raised the will is entered, with the sanction of the court, and the executors must give bond, if required, to proceed with the administration of the estate according to the provisions of the will. See WILL; ADMINISTRATOR.

PROCEDURE, *pro se'dure,* a legal term which refers to the various steps taken in conducting a suit in a civil or criminal court. The action in a civil suit begins with an issuance of a *writ of summons,* which demands that the *defendant* appear in court. The formal statements of the positions taken by the defendant and by his opponent, called the *plaintiff,* constitute the *pleadings.* Then comes the argument of the *issue.* If the facts in the case are admitted, but the counsel for the defense denies that there is sufficient cause for action against the defendant, a *demurrer* is entered. The decision in this case rests with the judge, for the point at issue is one of law. If the facts are questioned, the decision must be rendered by the jury, which acts according to the evidence presented.

The *arrest* of a person accused of crime is the first step in a criminal case. Then follows an *examination* before the proper officer, who either discharges the accused or orders further investigation by the *grand jury.* If the grand jury finds that the evidence warrants it, an *indictment* is entered against the accused, and he is held for trial before a *petit jury.* Between the preliminary examination and the grand jury investigation, and between the indictment and the trial, the accused is confined in jail or is released on bail. In case of such serious crimes as wilful murder and treason, bail is not granted. The evidence presented during the trial is weighed by the jury, and a verdict of guilty or not guilty is rendered at the close. If the prisoner is found guilty he is sentenced by the judge in conformity with the law. The jury may sometimes make recommendations.

The defeated party in a civil suit may apply to a higher court for a new trial, and this privilege is also granted the defendant in a criminal suit. A defendant declared not guilty of a criminal offense cannot be retried on the same charge.

Consult Lewson's *Pleading, Practice and Forms at Common Law.*

Related Subjects. The reader is referred to the following articles in these volumes:

Appeal	Demurrer
Arrest	Indictment
Bail	Jury and Trial by Jury
Courts	Writ

PROC'TER, ADELAIDE ANNE (1825-1864), an English poet, daughter of Bryan Waller Procter, was born in London. Charles Dickens had much to do with making her known to the public, for her earliest poems were sent, under the pen name of MARY BERWICH, to *Household Words,* of which he was editor. Her verses show no great genius, but are marked by tenderness and sincerity of emotion, and are evidently the expressions of a beautiful spirit. The most popular of her poems is *A Lost Chord,* which Sir Arthur Sullivan set to music. It is a permanent addition to the world's popular songs; some of its lines most frequently quoted are as follows:

* * * I struck one chord of music
Like the sound of a great Amen.

It flooded the crimson twilight,
Like the close of an Angel's Psalm;
And it lay on my fevered spirit
With a touch of infinite calm.

PROCTOR, [ALEXANDER] PHIMISTER (1862-), a Canadian sculptor, known for his vivid, powerful studies of wild animals. Proctor was born at Bozanquit, Ont., but as a boy removed to the United States. There he sketched wild animals in the Rocky Mountains, and later studied sculpture in New York and Paris. His work first won public attention at the World's Columbian Exposition at Chicago in 1893, and won medals at the expositions at Paris in 1900, Saint Louis in 1904, and San Francisco in 1915. Among his best known groups are the *Panthers,* now in Prospect Park, Brooklyn; the *Lions,* on the McKinley Monument at Buffalo; and the *Dog with a Bone* and the *Fawn,* two small statuettes in the Metropolitan Museum of Art at New York.

PROCTOR, MARY, a well-known astronomer, the daughter of the English astronomer, Richard Anthony Proctor. She was born in Dublin, Ireland, was graduated at the College of Preceptors, London, in 1898, and later studied in the United States at Columbia University, New York City. Miss Proctor has specialized in the practical study of solar and meteoric phenomena, having made observations of the total eclipses of the sun at Kunnen Promontory, Norway, on August 9, 1896; at Norfolk, Va., May 28, 1900; and at Burgos, Spain, August 30, 1905. She also viewed the meteoric display of November 13, 1899.

She has lectured over 800 times on astronomy since 1893, and has given annually since 1894 courses of lectures under the auspices of the New York Board of Education. She is a mem-

ber of several learned societies and is a frequent contributor to magazines. Her writings include *Stories of Starland; Giant Sun, His Family;* and *Half Hours with the Summer Stars.* See PROCTOR, RICHARD ANTHONY.

PROCTOR, RICHARD ANTHONY (1837-1888), an English astronomer who did much to increase the general knowledge of astronomy by writing in a popular manner on a great variety of astronomical subjects. He was born at Chelsea, and on the death of his father his mother undertook his education at home, on account of his delicate health. However, he graduated with honors from Saint John's College, Cambridge, and turned his attention to astronomy and authorship, which he unfortunately found at first to be anything but a lucrative profession. The general public was difficult to interest and his works were hard to sell. The failure of a bank left him dependent on the sale of his works. Although disappointed and inclined to adopt any other kind of labor which would ensure him a livelihood, he found that by changing his style and writing in a more popular vein the sale of his books greatly increased.

His *Handbook of the Stars* was privately printed, and sold fairly well; his *Half Hours with the Telescope* brought him $125—a small sum for a book that reached its twenty-sixth edition. He became a regular contributor to scientific periodicals, took pupils in mathematics and held the position of mathematical coach for Woolwich and Sandhurst. He was a popular lecturer on astronomy in England, America and Australia, and contributed no fewer than eighty-three papers to the Monthly Notices of the Royal Astronomical Society, of which he was elected a member in 1866 and became honorary secretary in 1872. He was the author of the articles on astronomy in the *American Encyclopaedia* and also the *Encyclopaedia Britannica.*

Proctor settled in America in 1881, where he remained until his death. His memory was honored by the erection of an observatory near San Diego, Cal. (See biography of his daughter, above.)

PROF'IT, a gain resulting from employment of capital or from any commercial transaction. Roughly illustrating what profit is, it may be said that if a certain article costs the producer fifty cents and he sells it for seventy-five cents, he has made a profit of twenty-five cents. That, however, while apparently true, is not a reliable way of measuring profit, as over and above cost of production nearly always there are other charges which must be deducted from the profit, among these being rent, light, taxes, etc. Whatever accrues to a business above raw material, interest on capital invested, depreciation, rent, wages and marketing expense, may be considered as profit. The cost of production must therefore embrace all charges against the business until such articles as it manufactures are actually sold. The rate or percentage of profit is the proportion of the amount gained to the amount of capital invested.

PROFIT SHARING, a system by which employees are given a share in the profits of a firm, in addition to their regular wage. It may take the form of a cash payment made at the end of the year, of shares of stock in the business, or of a savings or an insurance fund from which the workingman is given a pension in his old age or his family a payment in case of his death.

The first notable experiment in profit sharing was made in 1842, in Paris, by a house painter named Le Claire, who found that the policy had the effect of increasing the remuneration of both employee and employer through the better quality and greater amount of work accomplished. The method has since been widely adopted in England, France and America, and in most cases it has proven very successful. Among the American firms which have this plan in operation are Proctor & Gamble, of Cincinnati, the United States Steel Corporation and the Ford Motor Works of Detroit.

The advocates of profit sharing claim that it insures justice for both capital and labor, each receiving more under the efficiency which the system encourages, and that it lessens industrial unrest by harmonizing the interests of both classes. Labor leaders profess to see in it, however, only a substitute for real reform, and contend that it hinders the good that should be accomplished through trade unions, stimulating the laborers to greater production and then giving them only a portion of the results. They object to its likeness to philanthropy, and greatly prefer that a higher wage be regularly paid and the wage earner be left to make his own disposal of the increase.

Consult Fay's *Copartnership in Industry;* Williams' *Copartnership and Profit Sharing.*

PROGRESSIVE, *pro gres'iv,* **PARTY,** a political party in the United States, organized in 1912. It represented the culmination of a liberalizing movement in the Republican party which had been gathering force for two decades. During the Presidential administration

of William H. Taft the more radical Republican leaders became active opponents of his conservative policies, and in the convention of 1912 there was great opposition to his renomination. The strongest candidate of the liberal element was Theodore Roosevelt. In organizing the convention, however, Mr. Taft's supporters were able to seat Taft delegates in almost all contested delegations and thus obtain sufficient votes to nominate their candidate. The Progressive leaders, charging fraud, retired from the convention and organized a new party, later selecting Theodore Roosevelt as their nominee for President and Hiram W. Johnson, governor of California, for Vice-President. The platform urged social, political and economic reforms.

In the subsequent election the Progressives polled 4,126,020 votes (as compared with 3,483,922 for the Republicans), carrying California, Washington, South Dakota, Minnesota and Pennsylvania. However, the various elections held in November, 1914, revealed a weakness in the party, which carried only California and lost in all 2,213,090 votes. The total Progressive vote in that year was 1,916,417, while the Republican vote showed a gain of 2,528,418, indicating that a very large proportion of the Progressives had returned to the parent party. The Progressives maintained their organization, however, and in 1916 held a national convention in Chicago, nominating Roosevelt for President and John W. Parker of Louisiana for Vice-President. No campaign was made, as Roosevelt declined to run. Instead, he gave his support to the Republican candidate, Charles E. Hughes, and most of the Progressive leaders followed his example. The fall election, which resulted in victory for Woodrow Wilson, Democrat, indicated that the breach in the Republican party was not yet healed and that Progressive ideals were still a force to be reckoned with. See POLITICAL PARTIES.

Consult Payne's *The Birth of a New Party;* Roosevelt's *Progressive Principles.*

PROHIBITION, *pro hi bish' un.* "The world against John Barleycorn" is the picturesque phrase used by the antiliquor forces to describe the extent of the prohibition movement of to-day. When the sources of opposition to the liquor traffic are counted, it does not seem surprising that what has appeared to be an impregnable business should totter under the assaults directed against it. The traffic in alcoholic beverages has been fought on moral, social, economic and scientific grounds, with the economic issue probably having the greatest weight. All of these points are discussed in these volumes under the heading ALCOHOLIC DRINKS. It is the purpose of this article to show the status of the prohibition movement in those countries of the world where it has made headway.

In the United States. Previous to the War of Secession Maine and a few other Eastern states passed state-wide prohibition laws, but they were repealed in all of the states except Maine. After the war the liquor business developed rapidly; millions of dollars were invested in breweries and distilleries, and saloons multiplied throughout the country. With the development of the liquor industry came a strong countermovement for prohibition. In 1872 the Prohibition party held its first national convention. This organization represented an attempt to make the temperance cause a political issue, as both the Republican and the Democratic parties refused to insert prohibition planks in their platforms. Two years later the Woman's Christian Temperance Union was organized. Both of these organizations, and numerous smaller bodies, have aided the antiliquor movement immeasurably by keeping the issue constantly before the people, but the more practical results have been achieved through the efforts of the Anti-Saloon League, organized in Ohio in 1893.

This society has worked on the principle that if you cannot cut down the whole tree it is a good plan to lop off some of the branches. Accordingly, where it was not found possible to secure a state prohibition law at the outset, its leaders worked hard for local option, with the city, township or county as the prohibition unit. In many instances states have almost voted themselves "dry" by applying in sections the local option principle. What had been accomplished is shown in the "wet" and "dry" map of the United States, on page 4834. On July 1, 1919, thirty-one states were already in the dry column, or had voted to have state-wide prohibition go into effect on a definite date. There is little doubt that soon all the states, with notable exceptions, would have been "dry" territory by local action. As the map shows, there were numerous dry sections in most of the wet states. Alaska (1918), Porto Rico (1917) and the District of Columbia (1917) had also been voted prohibition territory.

However, the nation became interested in the liquor question. The United States Congress passed and the Supreme Court declared

constitutional (1916) the Webb-Kenyon law, which stopped the transportation of liquor into prohibition states through interstate commerce. This law put a stop to the practice of shipping liquor from a "wet" to a "dry" state, by which many prohibition laws had been practically nullified. Another Federal legislative act of far-reaching effect was passed in 1917. This act made it unlawful for anyone to send through the United States mails liquor advertisements or solicitation circulars addressed to people in "dry" territory.

A constitutional amendment prohibiting the manufacture and sale of alcoholic bev-

STATUS OF PROHIBITION BEFORE THE AMENDMENT

The states shown in white had banished intoxicating liquor before July 1, 1919. The black areas mark the only sections of the United States where liquor was legally sold before all saloons were closed at midnight on June 30, 1919.

erages throughout the United States had been the goal of the antiliquor forces for years. The first definite step towards this goal was taken at the close of 1914, when the House of Representatives passed such an amendment by a majority vote, though not by the necessary two-thirds.

With the entrance of the United States into the great war in Europe, a new phase of the question presented itself. Aside from the fact that a nation at war is more efficient when under a prohibition régime, there was the equally important fact that grains which should be used for food are employed in brewing and distilling. These points were urged by the prohibition leaders in Congress in the summer of 1917, when the food control bill was being framed. In its final form this bill carried a section prohibiting the manufacture of distilled liquors; the manufacture of beer and wine the President was given authority to suppress whenever he should deem it necessary. Accordingly, no whisky was manufactured after September 1, 1917; no beer after May 1, 1919. On July 1, 1919, under the war-time act, all intoxicating liquors ceased to be sold, and no saloon in America operated legally after that date, even though the national amendment was not yet in effect. In the autumn of 1917 Congress provided for an Amendment to the Constitution of the United States which would make the entire country prohibition territory. Its form is as follows:

"SECTION 1. The manufacture, sale, or transportation of intoxicating liquors within, the importation thereof into, or the exportation thereof from the United States and all territories subject to the jurisdiction thereof, for beverage purposes, is hereby prohibited.

"SECTION 2. This article shall be inoperative unless it shall have been ratified as an amendment to the Constitution by the legislatures of the several states, as provided in the Constitution, within six years of the date of the submission thereof to the states by the Congress.

"SECTION 3. The Congress shall have the power to enforce this article by appropriate legislation."

The necessary thirty-six states ratified the amendment and gave it validity by January

16, 1919. By proclamation of the Secretary of State of the United States, January 16, 1920, was therefore fixed as the date when national prohibition should be in full force and effect. Eventually forty-five states ratified the amendment.

In Canada. A local-option measure, known as the Canada Temperance Act, was passed in 1878, prohibiting the sale of intoxicating liquors in places that should adopt it. In the years that followed a number of counties and municipalities throughout Canada put the law into force, but the greatest advance in prohibition was made after the outbreak of the war in Europe. Saskatchewan "blazed the trail" in 1915, when the provincial government closed every bar in the province and greatly reduced the number of dispensaries. A referendum of the people was taken in December, 1916, and as a result the remaining dispensaries were voted out of existence by a majority of seven to one. In March, 1916, Manitoba voted for prohibition, to become effective on June 1, and in July of the same year prohibition went into effect in Alberta. In September a referendum was taken in British Columbia, and prohibition won. The soldiers in the trenches were also permitted to vote on the question, and they voted dry by a substantial majority. Provincial-wide prohibition was introduced into Ontario in the same year by a legislative enactment. By 1921 every province except Quebec and British Columbia had declared for prohibition. On January 1, 1917, Newfoundland became dry territory.

In Europe. The liquor traffic in Europe has met its heaviest assaults since the outbreak of the great war. Probably the most spectacular blow it received was the ukase of 1914, issued by the czar of Russia, which prohibited the sale of vodka, the national drink. Though the government was deprived of a large source of revenue by this measure, the improvement in the physical and economic condition of the people which followed more than offset the financial loss. In France beer and light wines are still popular drinks, but the sale of absinth has been prohibited (1915), and placards have been posted in police stations advising the people not to use whisky or brandy. In Germany the percentage of foodstuffs available for the brewers has been greatly reduced, so that restriction of the manufacture of liquor has come about automatically. England has adopted drastic regulation of the liquor traffic, instead of outright prohibition, though a strong prohibition movement is being pushed. Treating is now unlawful, and dramshops and public houses can be kept open only during specified hours. No liquor can be bought after ten o'clock at night. The number of public houses has been greatly reduced in the factory districts, and in some sections the business of liquor selling has been taken over by the government through boards of control. The alcoholic content of beer has also been greatly reduced. Lloyd George, in one of his speeches, said, "Drink is doing more damage to this country than all the German submarines put together." This statement is typical of war-time sentiment everywhere.

One other European country, Sweden, is approaching national prohibition. Soon after the war began the "Stockholm system" was adopted, whereby each citizen is allowed a fixed quantity of alcoholic drink. This system was extended by government order to the whole of Sweden on January 1, 1916, and it has resulted in a marked curtailment in the sale of liquor. In a test vote on national prohibition the vote stood 1,884,298 for and 16,715 against. B. M.W.

Consult Hayler's *Prohibition Advance in All Lands;* Fernald's *Economics of Prohibition.*

Related Subjects. In connection with this discussion of prohibition the reader is referred to the following articles in these volumes:

Alcoholic Drinks
Anti-Saloon League
Good Templars
License
Life Extension, page 3415
Local Option
Prohibition Party
Temperance
Woman's Christian Temperance Union

PROHIBITION PARTY, a political organization in the United States, formed in 1869, whose object was to prohibit by legal enactments the manufacture, sale and use of intoxicants as a beverage. The Grand Lodge of Good Templars in session at Oswego, N. Y., in May, 1869, appointed a committee to arrange for the calling of a national convention to organize a party pledged to the principles of prohibition. The convention met in Chicago in September of that year and organized the National Prohibition party. The first Presidential campaign in which the party took an active part was that of 1872, and in that contest it polled 5,608 votes. The number of votes increased in subsequent campaigns until the maximum was reached in 1892, when 264,133 prohibition votes were cast; after that time its strength declined, being only 221,329 in 1916. Probably the greatest man among the leaders of the movement was John P. St. John, former governor of Kansas, who was the party nominee for President in 1884.

While the all-important plank in their platform was that relating to prohibition, the prohibitionists also announced very definite policies on various important questions, such as finance, immigration, woman suffrage, etc. The addition of other issues in their platform has not always been approved by the more ardent members of the party, who would prefer to go before the people on the single question of prohibition. This disagreement led in the campaign of 1896 to the formation of a second prohibition party whose platform was limited solely to the issue of prohibition.

While the party has never played a prominent part in the political activities of the United states, it has exerted a great influence, and the principle it represented finally became effective. There were many workers in the cause of temperance who thought it a mistake to make prohibition a distinct political issue. They felt that the evils complained of could be best combated locally, thus gradually embracing the nation. Accordingly, they adopted the plan of local option, giving townships, municipalities and counties the right of settling for themselves the question of prohibition, regardless of the action of their neighbors. As success attended their efforts in one place, they extended their work to another locality, and in this way endeavored to secure state-wide prohibition. The success which has attended this effort is shown in the map accompanying the article PROHIBITION. The Prohibition party is given credit for keeping the saloon issue before the public and for hastening the day of absolute prohibition.

Related Subjects. See list at end of the article PROHIBITION.

PROJECTILE, a word derived from the Latin *projectare,* meaning *to throw forward.* It is now applied to bullets and shells thrown forward, or fired, from firearms.

Projectiles may be roughly divided into two classes—those for use on land and those employed in naval warfare. In naval warfare the object of the projectile is to penetrate the armor with which a battleship is protected, and sink or disable the vessel. So keen has been the race between destruction and defense that no sooner has a shell of great penetrative power been invented than armor plate is improved to withstand the assault of that particular shell. However, the advantage has been for the most part on the side of the projectile, and the most powerful battleship afloat is practically at the mercy of an enemy attacking it with guns of longer range than those possessed by the defender.

Related Subjects. The reader will find much material on this subject in the following articles:

Artillery	Grenade
Bomb	Navy
Bullet	Shell
Cartridge	Shot
Fireball	Shrapnel
Gas Clouds	Torpedo

PROMETHEUS, *pro me' thuse,* but commonly pronounced *pro me' the us,* was, in Greek mythology, a son of the Titan Iapetus, and the brother of Epimetheus and Atlas. To Prometheus and Epimetheus was intrusted the task of endowing the animals with the qualities and powers which they needed, and while Epimetheus was engaged in this work Prometheus occupied himself with creating man from clay. He found, however, when he demanded gifts with which to endow his new creature, that Epimetheus had been so generous to the lower animals that nothing remained for man.

To prevent his being left helpless at the mercy of the lower animals, Prometheus determined to bestow upon man the gift of fire, which would help him to subdue all things, living and inanimate; but fire was possessed by the gods alone, and it was necessary that Prometheus should obtain it without their knowledge. He stole up to Olympus, therefore, and stole back again bearing in a tube some fire, which he entrusted to mankind. Jupiter was so enraged at this theft that he had Prometheus chained to Mount Caucasus, where every day a vulture came and fed upon his liver, which at night grew again. For century after century Prometheus endured this agony, until Hercules took pity upon him, killed the vulture, and broke the chains which bound Prometheus. The gods punished mankind by sending among them Pandora. The story of Prometheus has been a favorite one with poets of all times. Aeschylus left a *Prometheus Bound,* which was translated by Mrs. Browning, and Shelley wrote a *Prometheus Unbound.*

PROMISSORY, *prom' is so ri,* **NOTE.** See NOTE.

PRONG'HORN, a cud-chewing animal of Western North America, locally called antelope. In point of fact it belongs to a separate family, of which it is the only representative. (A picture of the male and female pronghorn appears in the article ANTELOPE, page 278.) The pronghorn, unlike a true antelope, sheds the sheath of its horns annually, in this respect resembling the deer. Its body, which is some-

what like the deer's in shape, is about four and one-half feet long and three feet high, and is yellowish-brown above and white below, with white markings about the head and on the rump. The animal has slender legs, a short tail, erect, pointed ears and large eyes. The horns of the male, which curve inward, rise directly above the eyes and are a foot in length. The fact that they are forked is responsible for the animal's name. The female may have rudimentary horns or lack even these.

Pronghorns formerly gathered in large herds, which roamed the open plains and broad valleys from Mexico as far north as the Saskatchewan River, but they have been hunted until only a few remain. The Maple Creek Reserve in Canada, near Saskatchewan, was set apart in 1914 for the preservation of the pronghorn. The skin of the animal is not suitable for making fur garments, but the flesh has an excellent flavor, which accounts for their scarcity.

PRO'NOUN, the part of speech meaning literally *for noun* (Latin *pro* means *for*), which is used in place of a noun to avoid wearisome repetition. For instance, if we were to say, "Mrs. Allen warned Richard not to soil Mrs. Allen's new rug with the mud Richard was bringing in on Richard's shoes," the sentence would be clumsy. The substitution of pronouns gives ease and fluency; as, "Mrs. Allen warned Richard not to soil *her* new rug with the mud *he* was bringing in on *his* shoes."

In other words, a pronoun is a word that mentions a thing without naming it; and the word to which it refers, whether expressed or understood, is known as its *antecedent*. With this antecedent it agrees in person, number and gender. Its case depends upon its office in the sentence, and is regulated exactly like the case of the noun.

Classes of Pronouns. Various classifications of pronouns are made, but one of the simplest divisions is that into *personal, interrogative, relative, demonstrative* and *indefinite pronouns,* with the last two classes sometimes grouped, in their adjectival use, as *adjective-pronouns,* or *pronominals.*

Personal Pronouns. A word that in itself shows whether it represents the speaker, the person addressed, or the person or thing spoken of, is called a *personal pronoun.* If, like *I, we, myself,* it stands for the speaker, it is termed the *first personal pronoun;* if, like *thou, you, yourself,* it refers to the person spoken to, it is called the *second personal pronoun;* if, like *he, she, it, they, itself, themselves,* it implies the person or thing spoken of, it is known as the *third personal pronoun.*

Declension of Personal Pronouns. There is more formal grammar about the personal pronouns than is left to any other class of English words, for they are fully declined; that is to say, they have special forms to express all the different relations in which they stand in respect to number, person, gender and case. The declension of the *simple personal pronouns* follows in the first table printed below. See also DECLENSION.

The *compound personal pronouns,* formed by the addition of *self* or *selves,* have the same form for the nominative and objective cases, but they have no possessive use.

	SINGULAR			PLURAL		
	Nom.	*Poss.*	*Obj.*	*Nom.*	*Poss.*	*Obj.*
First person	I	my, mine	me	we	our, ours	us
Second person	thou	thy, thine	thee	ye, you	your, yours	ye, you
Third person	he	his	him	they	their, theirs	them
	she	her, hers	her			
	it	its	it			

Uses of the Compound Personal Pronoun. The compound personal pronoun has properly only two uses: (1) *reflexive,* as in "He did *himself* a great injury," "She saw *herself* reflected in her child;" (2) *emphatic,* as in "I did it *myself,*" "You *yourself* once expressed the same opinion." It is contrary to good usage to substitute the compound form of the pronoun for the simple form, as in "My mother and *myself* will leave for the East to-morrow," or "These cherries were sent for *yourself* and your sister."

	SINGUAR	PLURAL
First person	myself	ourselves
Second person	thyself, yourself	yourselves
Third person	himself, herself, itself	themselves

Interrogative Pronouns. The pronouns *who, which* and *what,* when used to ask a question, are called *interrogative pronouns.*

Who refers only to human beings or personified objects, and has distinctive forms for the

three cases; as, *Who* came? *Whose* writing is this? To *whom* are you telephoning? The case form is the same for both singular and plural.

Which is used to refer to human beings, animals and inanimate objects, and has the same form for the nominative and the objective, with no possessive use at all: *Which* of those men is your father? *Which* binding do you prefer?

What refers principally to animals, objects and abstract ideas, but when used before a noun it may refer to a person; as *What* are you looking for? *What* mother would not be just as ready to sacrifice herself for her child? *What* binding do you prefer? In the last example, *what* invites selection from an unlimited field, whereas *which* would imply that a choice must be made among a number of bindings which have been definitely mentioned or from among a group to which the speaker is referring.

Relative Pronouns. A *relative pronoun* is one that not only "relates" to an antecedent in a preceding clause, but serves as a conjunction connecting its own clause with the clause containing the antecedent. The relative pronouns are *who, which, that* and *what*. Their uses are illustrated in the following sentences: That boy *who* is sitting at the desk is my son. He has a volume of history there, *which* seems to be absorbingly interesting. The chapter *that* he is studying is an account of the War of the Nations. Let us ask him *what* it says about the Battle of Verdun. *Who* and *which* alone are declinable: nominative, *who, which;* possessive, *whose;* objective, *whom, which.*

To these four simple relatives there must be added the *relative compounds,* of which *whoever, whichever* and *whatever* are in most common use, with *whoso, whosoever, whichsoever* and *whatsoever* gradually becoming more and more archaic. Another relative, in constructions where it follows *such, same* or *many,* is the conjunction *as.*

Distinctions. *Who* is used for persons, the higher animals and objects personified. *Which* is used for animals and things only. *That,* most general of all, refers to both persons and things. *What* is used only in a neuter sense, and embodies its own antecedent in its meaning of *that which* or *the thing which.*

"Whose" as the Possessive of "Which." The older textbooks strenuously objected to the use of *whose* to express the possessive of *which,* insisting upon *of which* when referring to inanimate things. Modern usage, however, supports the practice in any construction where *of which* sounds awkward or roundabout. For example: "The principles *whose* application we are now studying constitute the framework of the science," rather than "The principles the application *of which* we are now studying," etc.

Which and That. Earlier grammarians were most particular to draw a sharp line between what they called "restrictive" and "non-restrictive" clauses. Restrictive clauses were introduced by *that;* non-restrictive, by *who* or *which.* For instance, in the sentence, "The bombs, *which* were made in this country, exploded prematurely," the clause *which were made in this country* is non-restrictive because it simply adds a new thought and implies that *all* the bombs exploded. If the sentence reads, "The bombs *that* were made in this country exploded prematurely," the clause is classed as restrictive and demands the relative *that*—the idea being that only part of the bombs exploded.

This distinction, however, is ignored by many good writers of the present day, and the tendency seems to be to let euphony settle the choice between *that* and *which.* For example, "That electric fan *which* you sold me" is preferred to "That electric fan *that* you sold me," on account of the repetition of *that.*

When the antecedent refers both to persons and things, *that* is always to be preferred; as, "Porters are on hand to look after all travelers and baggage *that* arrive by steamer." It is readily seen that neither *which* nor *who* would be appropriate in such a case.

Demonstrative Pronouns. Pronouns which point out some particular person or thing, answering the question *which,* are called *demonstrative pronouns.* This class includes *this* and its plural *these,* which indicate persons and objects close at hand; *that* and its plural *those,* indicating persons and objects that are more distant. Most authorities also include *former, latter* and *same.* When these words are used alone, as substantives, they are common pronouns: *This* is my fountain pen; *These* look fresher than *those.* When used to modify a noun they assume the nature of an adjective, and for this reason are often classed as *adjective pronouns* or *pronominals: This* fountain pen writes smoothly; *These* peaches look fresher than *those* apricots.

Indefinite Pronouns. The name of *indefinite pronouns* is given to another class of words which have the same double use as the demon-

stratives, but do not denote any particular person or thing. In this group are included *one, each, other, any, some, either, neither, both, many, sundry, several* and *certain,* together with their compounds, such as *anyone, anybody, each one, some one, somebody, no one, every one, either one, anybody else, nobody else,* and the like. To the same group belong also *aught, naught* and *none,* although these last-named indefinite pronouns cannot be employed as adjectives. The pronoun *it,* in such constructions as *"It* is storming," is likewise considered an indefinite pronoun. Forms like *each other, one another, every other* are termed *pronoun phrases.*

Either, Neither, Each. Either and *neither,* when employed as pronouns or pronoun-adjectives, should never be used in connection with more than two persons or things. Careful writers also apply the same rule to the phrase *each other,* although there is a tendency to consider *each other* and *one another* as interchangeable. What is important to remember, however, is that *each, every, either* and *neither* are singular in meaning and that when they stand as antecedents they must be followed by singular pronouns; as, *"Each* member is requested to place *his* contribution in the envelope provided"—not, in the language of the careless speaker, *their contributions.*

Note also that it is correct to say, "Each boy and girl should bring *his* contribution to-morrow," rather than the cumbersome *his or her,* since in the absence of a special personal pronoun of common gender, usage has adopted the pronoun *he.*

Parsing the Pronoun. To parse a pronoun, one must state the class to which it belongs; its antecedent, expressed or understood; its person, number and gender; its case, and the work it performs in the sentence.

Type Sentence: A man who respects himself is respected by others. Who is a relative pronoun whose antecedent is the word *man;* it is therefore third person, singular number, masculine gender; it is in the nominative case, as the subject of the verb *respects. Himself* is a compound personal pronoun, used reflexively; its antecedent is *who;* it is third person, singular and masculine; objective case, object of *respects. Others* is an indefinite pronoun whose antecedent is understood. It is third person, plural, common gender and in the objective case as object of the preposition *by.*

Common Errors. The pronoun suffers much misuse at the hands of ignorant or careless speakers. The nominative is frequently used for the objective, and vice versa; the pronoun is not always made to agree with its antecedent in number and gender; it is sometimes wrongly made to agree in case, whereas its case is properly determined by its use in the sentence; and often ambiguity results because the pronoun has not been so placed that its antecedent is perfectly clear. These and various other common errors are covered in the following examples. See also errors listed under CASE, NOUN, PARTICIPLE.

Margaret, too, was naturally curious, but it never tormented her as it did her sister, for *Margaret, too, was naturally curious, but her curiosity never tormented her as it did her sister.* We must not leave the antecedent to be inferred from the adjective *curious.*

He is a faithful employee, whom I know will prove a valuable worker, for *He is a faithful employee, who I know will prove a valuable worker. Who* is not the object of the verb *know,* but the subject of *will prove* and therefore in the nominative case. *I know* is really parenthetical; by omitting it, the true sentence structure is readily recognized. This is a very common error.

Whom did you say was at the party? for *Who did you say was at the party?* Another error similar to the foregoing. The sentence is, *Who was at the party? Did you say,* being merely parenthetical, does not affect the case of the pronoun.

Those sort of girls make themselves unhappy, for *That sort of girl makes herself unhappy. Sort,* being a singular noun, demands a singular pronoun and a singular verb. However, when the reference is to several varieties, *these* may very properly be used with *sorts or kinds;* as, *I do not care for these kinds of nuts.*

Did you notice them girls on horseback? for *Did you notice those girls on horseback? Them* is not one of the adjective-pronouns; therefore we cannot use it to modify *girls.*

At either end of the path grew a giant lilac bush, for *At each end of the path grew a giant lilac bush. Either* means one or the other. *Each* refers to both, considered singly.

Donations may be sent in care of either of these five newspapers, for *Donations may be sent in care of any one of these five newspapers. Either* refers properly to no more than two.

One is apt to lose their head when an accident occurs, for *One is apt to lose one's head when an accident occurs. One,* being a singular pronoun, cannot be followed by the plural possessive *their. One's,* it should be noted, is preferable to *his.*

He handles a racket better than her, for *He handles a racket better than she.* Expand the sentence to read, "He handles a racket better than *she does,*" and the necessity of the nominative pronoun becomes apparent.

It was her we wanted, for *It was she we wanted.* The verb *to be* requires the same case after it as before it; hence the nominative *she.* The true object of *wanted* is the relative pronoun *whom,* understood.

Don't be afraid; it is only me, for *Don't be afraid; it is only I.* Here again the verb *to be* calls for the nominative. We have heard stu-

dents confess that they hesitated to say "It is I" or to answer "I" to the question, "Who is it?" because of a feeling that it savors of affectation. This is sheer absurdity.

Her and me are neighbors, for *She and I are neighbors.* This is a frequent error among children and illiterate people. The objective form of the pronoun cannot stand as the subject of the sentence.

Between you and I, he invited only we two, for *Between you and me, he invited only us two.* If we transpose the two objects of *between,* saying *between I and you,* and omit the numeral after the pronoun, to make the sentence read *he invited we,* the mistakes take on added clearness.

That canary of her's is molting it's feathers, for *That canary of hers is molting its feathers.* One frequently sees this misuse of the apostrophe. The forms *hers* and *its* are already possessive.

Outline on Pronoun

I. Definition and Derivation
II. Classes
  (a) Personal
    1. Simple
    2. Compound
  (b) Interrogative
  (c) Relative
  (d) Demonstrative
  (e) Indefinite
III. Parsing the Pronoun
  (a) Essentials to be stated
  (b) Type sentence
IV. Common Errors

PRONUNCIATION, *pro nun si a'shun,* **OF FOREIGN NAMES.** The French and Germans, in speaking proper names of other nationalities than their own, usually give to such names the pronunciation they would have in French or German. The English custom, however, differs from this, and requires that a foreign proper name shall be pronounced as nearly as possible as it would be in the language to which it belongs. In the United States it is becoming a common practice to speak all foreign words with ordinary English pronunciation; this custom is endorsed by leading scholars. Thus Americans feel it quite proper to say *Don Quicksote* instead of *Don Kehotay* for *Don Quixote.*

Almost all of the European alphabets were derived from the Roman, but many of the letters have acquired such different values in the various languages that it is almost impossible for a person acquainted only with English to tell anything about the pronunciation of foreign names unless he has specific information as to the different letter sounds. It would be impossible, for instance, for an Englishman or American to guess that the Spanish words *La Jolla* sound more like *La Hoya* than any other English equivalent.

This article aims to give information which it is hoped will be sufficient to assist one in pronouncing names in any of the European languages. There are few general rules which can be stated. It may be said, however, that in most languages except English each vowel is sounded, except in cases of double vowels, when the two usually make one syllable, as in Dutch *Baas,* pronounced *bahs.* It is possible, therefore, to tell at a glance how many syllables a foreign word has—as many as there are vowels.

Accent. In almost every speech, one syllable of each word is stressed more than the others, but in no other language is this accent as strong as in English. Unaccented syllables are in general given more nearly their full value, and the accented syllable is not dwelt upon emphatically. To foreigners, the English seem to drawl, because they exaggerate the length of the vowel in an accented syllable.

In *French* the accent is particularly weak, some linguists declaring that there is no accent at all; but the slight stress falls uniformly on the last syllable. The *German* system of accenting closely resembles the English, and one who is familiar with the latter language can almost invariably place the accent correctly in German words. In *Italian* the accent usually falls on the next to the last syllable, while in *Spanish* and *Portuguese* it falls on the last syllable, unless that syllable ends with a vowel, or, in Spanish, with *n* or *s.* In such cases the next to the last syllable is accented. In *Hungarian* the accent is always on the first syllable, while in *Welsh* and *Polish* it is usually on the next to the last. The accent of a *Greek* word is determined by the accent mark of the written word, and *Turkish* resembles the *French* in placing a light accent on the last syllable. *Russian* admits of no general rules, each case requiring special knowledge.

Phonetic Value of Letters. The following list, while not exhaustive, gives the chief values of the vowels and consonants in the modern languages of Europe. If nothing is indicated as to the sound of a letter, it is pronounced as in English.

A has in most languages one of the more open sounds, as in English *father, grass,* or even *hat.* In Hungarian *a* without a diacritical mark most closely resembles *o* in *not,* while *á* is like *a* in *far.* Certain East Indian languages have a short *a* like *u* in *shut.*

Â in French is like *a* without an accent mark, and resembles *a* in *car;* in Rumanian it is like *i* in *pin.*

Ä is but another way of writing *ae.* See below.

Ă in Rumanian is like *e* in *fern.*

Å in Swedish is closest to English *a* in *hall,* though sometimes it resembles *o* in *obey.*

AA in Danish and Norwegian is like the Swedish *å;* in Dutch it is like *ae.* See below.

AE in German (frequently written *ä*) is sometimes like *a* in *rate,* sometimes like *e* in *met;* in Dutch, like *a* in *father;* in Swedish like *e* in *met;* in Danish and Norwegian like *a* in *cat;* in Welsh most nearly like *i* in *price.*

ÃE in Portuguese is like *i* in *price,* but is given a nasal twang.

AI in most languages is pronounced like *aye* "yes," although usually shortened to the sound of *i* in *price.* In French it resembles *a* in *fate* and in modern Greek *e* in *met,* while the Hungarian equivalent *aj,* where *j* is a vowel, is like *oy* in *boy.*

AM, AN in French and in Portuguese, if they are final or are followed by a consonant other than *m* or *n,* have the sound of *a* in *father,* spoken through the nose. The Portuguese *a* has the same value. English has no sound equivalent to this, and in books which make use of a phonetic system of pronunciation, as do these volumes, the nasalized *n* is usually indicated by an italic capital, as *N.*

ÃO is like English *ou* in *mouse,* but nasalized.

AU is in most languages like *ou* in *mouse*—the German *Haus* and English *house* are identical in sound and meaning. In French, however, this diphthong has the sound of *o* in *note.*

ÄU in German, like *oi* in *foil.*

AW in Welsh, like *ou* in *mouse.*

AY is generally treated like *ai.* In French and Spanish, when succeeded by a vowel, the *y* is given its consonant value and the *a* pronounced as though it stood alone.

B in German, Dutch and the Slavic languages is pronounced like *p* if it is final or followed by a consonant. In Spanish *b* more closely resembles the English *v,* though the lips alone and not the teeth are employed in its pronunciation.

C, before *e, i* or *y,* the vowels which follow the "soft" sound of *c* in English, is pronounced in German like *ts;* in French and Portuguese like *s,* in Spanish sometimes like *th* in *thought,* sometimes like *s* in *sit.* In Welsh and Gallic it always has the *k* sound, and in the Slavic languages it is always like *ts.*

Ç is like *s* in *sun.*

Č in Bohemian, Servian and Bulgarian and *ć* in Polish are like *ch* in *chair.*

CC in Italian is a compound sound like *t-ch* in *chit-chat.*

CH in Spanish is like *ch* in *chair;* in Italian like *k;* French and Portuguese like *sh* in *shall.* In German *ch* has a guttural sound which has no equivalent in English, though the Scotch has it in *loch.* It is made between the back of the tongue and the soft palate. See G below.

CS in Hungarian is like *ch* in *chair.*

CU in Spanish is like *qu* in *quit* if it is followed by a vowel and has no accent, as *cü* or *cú.*

CZ in Hungarian is like *ts;* in Polish like *ch* in *chair.*

D in German, Dutch and the Slavic languages has the same relation to *t* that *b* has to *p*—is pronounced like it when final or when preceding a consonant in the same syllable. In Spanish, Danish and modern Greek it is almost like *th* in *this* when it occurs at the end of a word or between two vowels; and in Danish and Norwegian it is silent after *l* or *n* in the same syllable.

DD in Welsh is like *th* in *this.*

DT is like *t.*

DZ is like *j.*

E has various sounds in the European languages, but in none except modern Greek does it have the English "long *e*" sound, as in *he.* It may be like *a* in *mate,* or in *rebate,* like *e* in *met* or in *where.* In French final *e* is silent unless it has an accent, and is much slighted when it ends any syllable.

É in French is like *a* in *mate.*

È and Ê in French are like *e* in *where* or like *a* in *rebate.*

EAU in French is like *o* in *note.*

EI in French is like *a* in *rebate;* in German, Dutch and Welsh like *i* in *pine,* and in other languages like *a* in *ray.*

EIN in French is equivalent to *in* (see below).

EN in French is like *an* (see above).

EU in French and Dutch is much like *e* in *her.* It has, however, no real equivalent in English, but is like the German *ö.* In German *eu* is like *oi* in *toil.*

G before *a, o* or *u* is like *g* in *get* in all the European languages; in German it has the same sound when used at the beginning of a word or before a vowel or a liquid in the same syllable. In French, Spanish, Portuguese, Swedish and Rumanian, *g* has before *e, i* or *y* the sound of *j* in the same language (see *j* below), while in modern Greek it is like *y* in *yet.* In German and Dutch it has in certain positions a guttural sound, like that of the German *ch.*

GH in Italian and Rumanian is like *g* in *get;* in Irish it is more like *h.*

GLI in Italian when followed by a vowel is like *lli* in *William;* when final, or followed by a consonant, the *i* is pronounced like *e* in *be.*

GN in French and Italian is like *ñ* in Spanish or *nh* in Portuguese—like the English *ni* in *minion.*

GU in French is like *g* in *game* before *e, i* or *y,* unless a consonant or an *ë* follows, in which case the *u* has its regular sound. In Italian *gu* is always like *gw* in *Gwen.*

H in French, Spanish, Portuguese and Italian is silent except in such combinations as *ch, gh,* and the like. In German it is silent between two vowels in the same word, except where preceding *ei,* and in Swedish it is silent before *j.*

I in most European languages has the sound given it in *machine,* or the shortened sound in *it.* In a few Danish names it is like *e* in *met.*

IE usually has the sound given it in English in *yield.*

IEN in French is like *in* preceded by a *y* sound.

IJ in Dutch resembles *i* in *price.*

IL final and *ILL* in the middle of a word in French have the sound of *y* in *yes* when they follow a vowel which is pronounced; otherwise they have the sound of *i* in *machine,* followed by the sound of *y.*

IM and IN in French are like *a* in *hat,* but pronounced through the nose.

J in German, Italian, Dutch, the Scandinavian languages, Polish and Hungarian has the sound

of *y* in *yellow;* in French and Portuguese the sound of *s* in *pleasure,* and in Spanish the sound of *h,* very distinctly pronounced.

K is in most languages pronounced as in English; in Swedish, however, before *e, i, y, ä* or *ö* it closely resembles *ch* in *chair.*

LL in Spanish is like the sound of *lli* in *million,* though in names of places in the colonies, or in North America, the *l* sound is usually not heard. Thus *La Jolla* is *La Hoya,* as noted above, and not La *Holya.*

M and N are like the English *m* and *n* except where they serve merely to give a nasalized character to vowels (see AM, EN, IN, UM).

Ñ in Spanish and NH in Portuguese are like *ni* in *minion.*

NG in German is always like *ng* in *wringer.*

O is most frequently like *o* in *no, obey, eore,* though sometimes like *o* in *rot.* In Swedish a final *o* or one which constitutes a syllable is like *oo* in *school* or like *u* in *pull.*

Ö has no exact English equivalent, but is most nearly like *e* in *fern.*

Ô in French is like *o* in *note.*

Õ in Portuguese is like *o* in *note,* pronounced through the nose.

OE is sometimes a substitute for *ö;* in Dutch, however, it is pronounced like *u* in *rule* or *pull;* in Welsh like *oi* in *toil.*

ŌE in Portuguese is like *oi* in *toil,* spoken through the nose.

OEU in French, is like *eu* (see above).

OI is in general much like *oi* in *oil;* in French, however, it is like *wa* in *wasp.*

OIN in French is like *in* (see above) preceded by the sound of *w.*

OO is like *o* in *note.*

OU in French is like *u* in *rule, pull;* in Portuguese like *o* in *note;* in Dutch and Norwegian like *ou* in *house.*

QU in French and before *e* or *i* in Spanish and Portuguese is like *k;* in German like *kv,* and elsewhere like the English *k* in *quiek.*

R has in most European languages more of a trilled sound than in English. Certain French and German words require a guttural sound of *r* which cannot be indicated in English.

Ř in Bohemian is like *r* followed by the sound of *s* in *pleasure.*

S, in German, if before a vowel and not following a liquid or a surd (*p, f, s, t* or *k*), and in French between two vowels, is pronounced like *z* in *zither.* In Hungarian, and in German where it precedes *t* or *p,* it has the sound of *sh* in *shall,* and in Portuguese it resembles *sh* if final or preceding *p, f, t* or *k* and *zh* (*s* in *pleasure*) before *d, b, v* or *g.* In Spanish, Dutch and Swedish *s* is always pronounced as in *sun,* while in Italian it has sometimes this sound, sometimes that of *z.*

Š in Bohemian, Bulgarian and Servian is like *sh* in *shall.*

SC in Italian before *e* or *i* is like *sh* in *shall.*

SCH in German is like *sh* in *shall;* in Italian and Rumanian, it is like *sk* before *e* or *i;* in Dutch like *sg* (see below) before vowels, like *s* before consonants.

SG in Dutch most nearly resembles English *sk,* though the *g* has a distinctly guttural sound.

SJ in Danish, Swedish and Dutch is like *sh* in *shall.*

SK in Swedish and Norwegian is like *sh* in *shall* before *e, i* and *y.* SKJ has the *sh* sound always in these two languages.

SS usually like *s* in *sun,* but in Hungarian like *sh* in *shall.*

STJ in Swedish closely resembles *sh* in *shall.*

SZ in Hungarian is like *s* in *sun;* in Polish like *sh* in *shall.*

TH is generally like English *t,* but in Welsh and modern Greek is like *th* in *thought.*

TSCH in German is like *ch* in *chair.*

TY in Hungarian is like *t* followed by a *y* sound, closely resembling the *tu* sound in *future.*

U has generally the *oo* sound, as in *rude,* or the sound of *u,* as in *pull.* The French *u* differs from any sound heard in English, but is like the German *ü.* If the lips are put in position for pronouncing *oo,* and *e* as in *be* is sounded instead, the result will be much like the French *u.* *U* in Welsh is like *i* in *pique.*

Ü, see U above.

UI in French is much like English *we,* except when preceded by *g* or *q;* in Dutch it resembles *oi* in *oil.*

UM, UN in French have much the sound of *e* in *fern,* pronounced through the nose.

UU in Dutch has a prolonged sound of *u.*

UY in French is like *ui,* except when a following vowel gives it an additional *y* sound.

V in Dutch, Polish and Russian is like *f* when it occurs at the end of a word or of one member of a compound word; otherwise it is like English *v.*

W in German, Polish, Swedish and Norwegian is like English *v;* in Dutch it more closely resembles the English *w,* though the lips are not rounded in pronouncing it. In Welsh it is a vowel and has the sound of *oo* in boot.

X in Spanish is sometimes pronounced like *j, g* or *s;* in Portuguese it is like *sh* in *shall.*

Y is generally like *i* in *pique.* In Danish, Norwegian and Swedish it is like the French *u.*

Z in German and Italian is like *ts* in *eats;* in Danish, Norwegian and Swedish, like *s* in *sin;* in Spanish like *th* in *thought,* though the colonies and some localities in Spain sound it as *s* in *sun.* In Portuguese it is like *sh* when final, and in other languages like *z* in *zither.*

Ž in Bohemian, Bulgarian and Servian is like *z* in *azure,* and *zs* in Hungarian has the same sound.

A.MC C.

PROPHET, *prof'et,* one who represents God before men. The true prophet, as pictured in the Old Testament, was a man of vision, who received a message from God; and a man of speech, who delivered that message to the people. There are two distinct periods of Old Testament prophecy. In the first, extending from Samuel to Elisha, the prophet was known as a *seer* and was commonly consulted as to the course of future events (*I Samuel* IX, 6). At first the prophets were the friends and advisers of the kings, but as idolatry began to be introduced by the later kings, they became their active opponents, as shown by Elijah's opposition to Ahab (*I Kings* XVIII).

In the second period of prophecy, extending from Amos to Malachi, the prophet was a preacher of righteousness who addressed the people on public questions and tried to mold society according to the standards of religion and morality. In this period, prophecies began to be written, and the last seventeen books of the Old Testament, excepting *Lamentations,* are prophecies of this period.

PROPORTION, in mathematics, an equality of ratios. *Ratio* is the relation of one quantity to another and is found by comparison. It may be expressed as a common fraction, as $\frac{2}{6}$ or $\frac{a}{b}$; or in the form of 2 : 6; a : b. The quantities compared are called the *terms* of the ratio. The first term is the *antecedent,* and the second the *consequent.* In the ratio $a : b$, a is the antecedent and b the consequent. If both terms of the ratio are multiplied or divided by the same number the value of the ratio is not changed. The ratio 2 : 4 is the same as 4 : 8; also, $\frac{5}{15}=\frac{15}{45}$.

A *proportion* is an expression of equality of ratios, as $2 : 4=3 : 6$; $a : b=c : d$. These expressions are read: 2 is to 4 as 3 is to 6; a is to b as c is to d. Proportions may also be expressed in common fractions, as $\frac{4}{2}=\frac{6}{3}$; $\frac{a}{b}=\frac{c}{d}$. The quantities compared in the two ratios constitute the *terms* of the proportion. The first and last terms are the *extremes,* the second and third the *means.* The general law of a proportion is: *The product of the extremes equals the product of the means.* In the proportion $2 : 4=3 : 6$, $2\times6=4\times3$.

Any extreme of a proportion may be found by dividing the product of the means by the given extreme, as $n : 4=3 : 6$; $\frac{3\times4}{6}=2$, the required extreme. Any mean of a proportion may be found by dividing the product of the extremes by the given mean, as $3 : 9=n : 12$; $\frac{3\times12}{9}=4$, the required mean.

In arithmetic, proportion is sometimes referred to as *the rule of three,* because three quantities are given to find the fourth.

PROSE, *proze,* as distinguished from poetry, the ordinary written or spoken language of man, lacking the rhyme and the regular metrical form of poetry. As spoken language, of course, it existed long before poetry, but as literature it dates from a later period. In the early days of a nation, long before the invention of printing or before writing became common, poems might easily be memorized and be handed down by word of mouth, whereas a prose composition would not lend itself to such forms of transmission. Prose had begun to fill an important place in the intellectual life of the world long before the invention of the printing press in the fifteenth century, but beginning with that date its importance increased very rapidly. Not everything that was published, however, was literature, any more than all the prose which to-day issues from the presses is literature. A really artistic prose literature, in fact, was a late development in the history of every nation, and great prose-writers are no more numerous than are great poets.

The commonly accepted classification of prose divides it into *narration, description, exposition* and *argumentation,* but few writings fall wholly within any one of these classes. Stories, in the main narrative, in character, often include much description and more or less exposition, while an oration, primarily argumentative, must usually contain a large proportion of exposition.

Related Subjects. The reader is referred to the following articles in these volumes:

Essay
Fable
Novel
Oration

PROSERPINA, *pro sur' pi na,* in classical mythology, was the daughter of Ceres, goddess of agriculture. Herself the special protector of flowers, Proserpina spent much time in the meadows attending to her favorites. One day while she was engaged in this pleasant task the god Pluto came by in his chariot, drawn by his coal-black horses. Seeing Proserpina, with whom he had long been in love, thus unprotected, Pluto seized her and bore her off in his chariot down to his underground home.

PROSERPINA

In vain the girl begged for release, and at length gave up hope of returning to the upper world and the light of the sun.

Meanwhile, Ceres had sought everywhere for her beloved daughter, and when she at last discovered her whereabouts she obtained from Jupiter and the Fates a promise that Proserpina might return if no food had passed her lips while she was in Pluto's realm. When Mercury went to bring her back to earth, however, he found that she had eaten six pomegranate seeds, and in consequence of this she was obliged to spend half of her time each year with her gloomy husband underground. During each six months that she was permitted to be above ground, vegetation flourished, but during the rest of the year winter reigned. This is one of the old myths which accounts for the change in seasons.

PROTECTION, *pro tek'shun,* in economics and government, is the policy of giving assistance to home industries, either by offering a bounty on domestic production or by placing a high tariff on foreign production. The payment of bounties is direct and convincing assistance, but it requires a costly and complex administrative machinery. The easiest way of securing protection is through high customs duties on imported articles.

The Theory of Protection. In theory, a protective tariff is intended to equalize the difference in cost of production of an article in two countries which are trade competitors. In Holland, for example, where wages are low, an article may be made and shipped to America at a cost of fifteen cents; under the higher wage system existing in America the cost of manufacture, not including shipping charges, may be twenty cents. If competition be based upon existing conditions the American factory owner would have to cease the manufacture of the article which can be produced more cheaply abroad. However, by the imposition of a tariff upon the product of the Dutch factory, that article, laid down in America, costs a sum more nearly equal to the manufacturing price in the United States. The proper theory of a protective tariff, then, is an import duty upon each competitive article of such an amount as represents the difference in the cost of production. In the concrete case above noted a duty of thirty-three and one-third per cent upon the Dutch article would make it cost twenty cents when laid down in America, and thus the American manufacturer could meet its competition on even terms.

Arguments of Its Defenders. In the United States a protective tariff as early as 1816 was defended rather on the ground of protecting industries already established than of encouraging new industries. This has been called the "vested interests" argument, that an industry built under protection would fail if protection were removed. A new argument was soon to find its chief exponent in Henry Clay; this was the "home market" theory, designed to reconcile the interests of the manufacturing and commercial North with the agricultural South and West. It is to the interests of both the farmer and the manufacturer, said Clay, to build up a system by which the farmer can find a home market for his products. The foreign markets, it was said, are more unstable; aside from that, the different sections of the country should be bound together by a system which furthers the general interest.

The next development in the theory of protection came during the War of Secession. The government, to raise funds, levied large and numerous internal revenue duties; to offset these a high protective tariff was necessary. There was, further, a considerable antiforeign sentiment—caused by the almost universal sympathy in Europe for the Confederacy—to support a high tariff. After the war the internal revenue taxes were gradually removed, but the import duties being practically unchanged, the tariff became increasingly protective. A new argument was subsequently marshaled to its defense—the "wages" theory. It was argued that a high tariff created and maintained high wages, and that the removal of protection would lower wages and reduce the American workman to the level of his European brother.

Summary. The arguments of protectionists and free traders may be summarized briefly as follows: The protectionist declares that high tariff promotes nationalism, or a closer union of a country's internal interests, builds up diversified industries, encourages attempts to develop natural resources, enables a nation to be self-dependent in times of war, promotes a home market, which is always surer and steadier than a foreign market, saves the farmer the cost of transportation to distant markets, and assures higher wages.

The free trader declares protective rates a violation of a man's natural rights to buy and sell wherever he will, and equivalent to paternalism, a term meaning the tendency of a government to control too closely the activi-

ties of its citizens. The free trader maintains that protection does not help nationalism and points to Great Britain as proof. He denies that protection causes diversity of industries in a country like the United States, where innumerable natural resources offer opportunities. Moreover, he points out that labor comes in competition, not with commodities, but with other labor, and American labor secures more wages, not because of tariff, but because it is more efficient. Again, it is maintained that the price of supplies is so high under protective rates that the American procures no more for his high wages than the Englishman. Protection, say its opponents, endeavors to compel a nation to produce what it is not well adapted to produce and thus lessens the sum total of the world's fruitfulness. Above all else, according to later opponents, protection fosters monopolies by shutting out international competition and fattens certain great combinations of manufacturies by compelling American citizens to pay more for goods than these same combinations, selling abroad, charge foreigners. As examples, it has been charged that American harvesting machines and steel rails are sold abroad cheaper than they can be purchased in the country of their manufacture. The question has been the subject of political battle for more than a century of America's existence, and the end of the strife is not yet in sight. See FREE TRADE. W.F.Z.

Consult Taussig's *Tariff History of the United States;* Stanwood's *American Tariff Controversies.*

PROTECTIVE COLORATION, *pro tek'tiv kul er a'shun,* widely but less correctly known as MIMICRY, is one of the greatest factors in the life of animals and plants for protection in the struggle for existence. Colors in nature are not always merely marks of distinction of species or attractions to insure reproduction, but are also protection against natural enemies. Fish are darkly-colored on top and light underneath, as a protection against enemies above or beneath them; some are colored like the weeds among which they live. Frogs and snakes which live in green foliage are colored a similar green. Birds, reptiles and animals of the desert are mottled-gray or are sand colored. Some hares, rabbits, weasels and other animals which live in cold climates change their earth-colored coats to coverings of white when snow and ice are on the ground. Everywhere will be seen protective coloration in harmony with surroundings and habits, from green caterpillars scarcely distinguishable from blades of grass, to brownish lizards on fence rails, white polar bears in Arctic snows, and slaty-blue sea gulls, the color of the sea.

Most wonderful and striking protective resemblances are seen, however, in structure as well as color, especially among the more delicately-constructed creatures of the world, the moths, butterflies and insects. The *kallima,* or dead-leaf butterfly, of India, settling on a twig and folding its wings, looks exactly like a dead, dried leaf. Many butterflies, fluttering about, look like falling leaves. The common walking-stick insect looks so much like a twig it is almost impossible to discover it even when looking directly at it. Some insects resembling other objects in nature lure to themselves the prey they require as food. For instance, an Indian insect called the *praying horse* looks like an orchid, and smaller insects, attracted to it, are caught. Some fly-catching birds of Brazil have flowerlike crests which attract their prey. This form of color resemblance also appears among carnivorous, or insect-eating, plants. The pitcher plant looks so much like a decaying piece of liver that insects are easily enticed into its deadly folds (see PITCHER PLANTS). Another plant illustration is that of desert cactus, which is afforded protection through its resemblance to poisonous euphorbias.

Another strange form of protective coloration—the form which suggested the term *mimicry,* although it does not appear through any act of the insect—is illustrated by the Viceroy butterfly. It is an edible butterfly not distasteful to birds, but, though not closely related to the Monarch butterfly, which birds will not eat, resembles the Monarch so closely that it is protected from its bird enemies. Numerous defenseless moths and flies are colored so much like stinging bees and wasps that they are avoided by their natural enemies.

Although many theories have been advanced to explain these facts, the generally accepted belief is that they are not the results of voluntary acts by the animals. They are the results of natural selection. Year after year, through the centuries, those individuals which were not well protected were destroyed, and creatures with the most effective coloration lived and were reproduced. M.S.

Consult Beddard's *Animal Coloration;* Poulton's *Colors of Animals.*

PROTECTORATE, *pro tek'toh rate,* a term in international law, used to denote the po-

litical relation between two countries of widely different extent and power, when the larger and more powerful of the two exercises control over the smaller, and assumes the responsibility of directing its most important affairs.

While the word is used rather loosely, it is generally understood that the relation of protectorate gives the dependent country the right to maintain a distinct and separate existence and to conduct its own internal affairs, under the general and benevolent direction of the protecting government. The exact relation between the two countries is usually fixed by treaty, which may be an arrangement between the two chiefly concerned, or the result of an agreement on the part of several nations respecting still another. It is always understood that the protecting country controls the international relations of its dependency, and also that it is responsible for protecting the smaller country from invasion and from every kind of injury.

Some of the states of India are protectorates of the British Empire. Great Britain, France, Belgium and other European nations possess protectorates in Africa. Among these are British East Africa, Tanganyiki Territory, French Congo, Belgian Congo, Portuguese West Africa, Italian Somaliland and others. The locations of these are shown on the colored map of Africa, and each is described in its place in these volumes.

PROTEIDS, *pro'te idz,* the name given a class of food substances consisting chiefly of carbon, hydrogen, oxygen and nitrogen. The word has practically the same meaning as *proteins* (see below), many authorities preferring the latter term.

PROTEINS, *pro'te inz,* a class of food substances whose special work is the nourishing of muscular tissues. They are the only organic food compounds that contain nitrogen; in addition, they are made up of carbon, hydrogen and oxygen, and they sometimes contain sulphur and phosphorus. Lean meat, the curd of milk, peas and beans, wheat flour and corn are important protein foods. For a fuller discussion of the subject see Food, subhead *Proteins,* page 2242.

PROTEROZOIC, *praht er o zo'ik,* ERA, the great division of geologic time extending from the Archeozoic Era to the Paleozoic Era. The era is noted for the extensive systems of sedimentary rock that were formed; in some localities these reached a thickness exceeding 30,000 feet. There are formations of igneous rock (rock formed by fire) between the different systems of sedimentary rock. Some geologists do not divide this era into periods; but those in North America generally recognize three rock systems, which are named from localities where they are the most prominent. These are the Huronian, from the rocks north of Lake Huron; the Animikean, from localities in Northwestern Wisconsin and Northwestern Minnesota; and the Keweenawan, from Keweenaw Peninsula on the south shore of Lake Superior. The Animikean System is of special interest, for it contains the great deposits of iron ore of the Mesaba and Iron ranges, which are now the chief source of supply of iron for the world.

The rocks of the Proterozoic Era contain few fossils, and it is therefore impossible to tell from them the nature of the life that then existed. See Geology and diagram on page 2439; Paleozoic Era.

PROTESILAUS, *pro tes i la'us,* in Grecian mythology, one of the chiefs who joined in the expedition against Troy. An oracle had foretold that the first Greek who attempted to land would meet death immediately; and Protesilaus, seeing that the other chiefs hesitated, leaped ashore and was instantly slain. See Troy.

PROTESTANT, *praht'es tant,* the general name for all Christian bodies outside the authority of the Roman or Greek Catholic Church. The Protestants now number about 200,000,000, including church members and adherents not formally affiliated with special denominations. The term was first used in 1529, when an edict of the Diet of Spires threatened the German Reformation with extinction. This assembly decreed that the Scriptures should be expounded only on the lines authorized by the Roman Catholic Church, and endeavored to restore the Mass in states where it had been discontinued. Several princes and fourteen imperial cities made a formal protest against the edict and from this circumstance became known as *Protestants.* The name soon came to mean all those who followed Luther (see Reformation, The). Later it became the general term for all members of the Christian Church outside of the Roman Catholic branch.

Consult Bousset's *Faith of a Modern Protestant;* Tröltsch's *Protestantism and Progress.*

Related Subjects. The subhead *Religion* in the articles on the various countries, states and provinces contain material of interest in this connection, as do also the following articles:

Adventists
African Methodist Episcopal Church
Anabaptists
Anglican Church
Articles, The Thirty-nine
Baptists
Chaplain
Christian Endeavor, Young People's Society of
Christian Science
Church of England
Congregational Church
Covenanters
Deaconess
Disciples of Christ
Dukhobors
Dunkers
Episcopal Church
Epworth League
Evangelical Alliance
Evangelical Association
Free Methodists
Huguenots
Hussites
Lutherans
Mennonites
Methodists
Missions and Missionaries
Moravian Brethren
Nonconformists
Perfectionists
Predestination
Presbyterians
Quakers
Reformed Church
Religion
Salvation Army, The
Seventh Day Adventists
Shakers
Swedenborgians
Unitarians
Universalists
Volunteers of America
Wesleyan Methodists

Biographies of the following Protestant clergymen and religious leaders are also given in these volumes:

Abbott, Lyman
Asbury, Francis
Beecher, Henry Ward
Booth
Brady, Cyrus Townsend
Brooks, Phillips
Burdette, Robert Jones
Calvin, John
Campbell, Alexander
Carman, Albert
Cartwright, Peter
Channing, William Ellery
Clark, Francis Edward
Coligny, Gaspard de
Cotton, John
Cranmer, Thomas
Drummond, Henry
Dwight, Timothy
Eck, Johann Maier von
Eddy, Mary Baker
Fox, George
Gordon, Daniel M.
Gunsaulus, Frank W.
Harvard, John
Hillis, Newell Dwight
Huss, John
Hutchinson, Anne
Jones, Jenkin L.
Jones, Samuel Porter
Knox, John
Latimer, Hugh
Laud, William
Luther, Martin
Mather, Cotton
Melanchthon, Philipp
Moody, Dwight Lyman
Sheldon, Charles M.
Sunday, William A.
Swedenborg, Emanuel
Talmage, Thomas De Witt
Taylor, Jeremy
Vaughan, Herbert
Vincent, John Heyl
Wesley, Charles
Wesley, John
Whipple, Henry B.
Whitefield, George
Wilberforce, Samuel
Williams, Roger
Witherspoon, John

PROTESTANT EPIS'COPAL CHURCH. See EPISCOPAL CHURCH; CHURCH OF ENGLAND.

PROTEUS, *pro'tuse,* or *pro'te us,* in Greek mythology one of the lesser gods of the sea, who possessed the gift of prophecy and had in common with all the gods the power of changing to any shape in which he wished to appear. When asked to prophesy, he invariably refused, and to startle the questioner changed rapidly through a bewildering variety of forms. To those who persisted in their questioning, however, he always in the end gave answer.

PROTOPLASM, *pro'toh plaz'm.* The unit of structure (see CELL) in all plant and animal life is a mass of jellylike, semitransparent matter called *protoplasm.* This name is from two Greek words meaning *first* and *creation;* protoplasm can truly be considered the first created thing, for it is the physical basis of life. Scientists have learned something about its composition and its physical properties, but they have never been able to produce it. As life must have had some beginning, it is assumed that some time in the history of the world a bit of protoplasm was created under conditions that have not since that time been duplicated, and that from this first cell life in all its complexity has evolved.

Chemically, protoplasm consists of proteins (compounds of carbon, hydrogen, oxygen, nitrogen and sulphur), together with a large percentage of water and small proportions of mineral substances. The general properties of protoplasm may be studied by watching through a microscope a one-celled animal like the amoeba. This minute creature—itself simply a mass of protoplasm—has the power of spontaneous movement; it is *irritable,* that is, responsive to changes in temperature and other stimuli (the sense of feeling in elementary form); it can assimilate food and throw off waste matter; it breathes, and it reproduces itself by cell division. Thus all the fundamental processes that are performed by higher animals by means of well-developed organs are carried on in the cell of protoplasm—the "start of life."

PROTOZOA, *pro to zo'a.* Young people, when they begin laboratory work in zoölogy, commence usually with the study of a tiny one-celled animal called the *amoeba.* This minute creature is the simplest type of the branch *protozoa,* which contains the lowest forms of animal life. The name is derived from the Greek and means *first animal.* All protozoans are one-celled animals; most of them can be seen only with a microscope, and nearly all live in water. The vital functions are performed by them in the most elementary way. In case of the amoeba and others of its type, the processes of eating, breathing, feeling, etc., are carried on by the entire cell mass, for there are no special organs. These forms move about by thrusting out portions of the cell body and drawing the rest of the mass after these projections, or "false feet."

The highest class of protozoa (infusoria) has delicate, hairlike processes called *cilia*

which serve as organs of locomotion, and a groovelike opening at one end of the body which serves as a rudimentary mouth. Some protozoans reproduce by cell division, each half of the original cell becoming a separate animal; with others, the parent cell puts forth a protuberance which breaks off and forms a new organism. This is called *budding*. Certain parasitic forms, such as the organism that causes malaria when introduced into the blood of a human being, multiply by dividing into small bodies called spores.

The oceans contain countless millions of protozoic organisms, and it is interesting to know that these myriads of one-celled creatures are an important source of food supply for marine animals. Most of the ocean protozoans have the body cell enclosed in a tiny shell of wonderful delicacy and beauty (see RADIOLARIA). Accumulations of the shells of one order (globigerinae) cover large sections of the floor of the Atlantic, appearing like thick masses of a slimy, gray mud; some of the world's largest chalk deposits are composed largely of the fossil shells of marine protozoa.

Related Subjects. The reader is referred to the following articles in these volumes:

Amoeba	Protoplasm
Cell	Zoölogy (outline of
Infusoria	animal kingdom)

PROUDHON, *proo dawN',* PIERRE JOSEPH (1809-1855), a well-known French socialist. He was born at Besançon, educated in the college there, and in 1828 entered the printing business. After an unsuccessful attempt to establish such a business of his own, he published, in 1838, his *Essai de grammaire générale,* and received in recognition of its excellence a three-year pension of 1,500 francs from the Academy of Besançon. Two years later he lost his pension and the approval of the Academy by the publication of *What Is Property?* wherein was contained the socialistic answer, "Property is theft." In 1842, on the appearance of a similar publication, he was prosecuted at Besançon, but was acquitted.

For three years he was in charge of a water-transport system on the Rhône and Saône, with headquarters at Lyons, but in 1848 he returned to Paris and took an important part in the revolution of that year. His views as published in the papers which he edited were more influential than was his work in the Constituent Assembly, of which he was a member. In 1849 he tried to found a People's Bank, which should be run according to his economic principles, but was forced to close the institution and escape to Geneva because of the opposition of the authorities to his theories. On his return his violent utterances led to his imprisonment for three years, and after his release he removed to Brussels, where he lived for eight years. Proudhon stands out as one of the important figures in the history of socialism (which see).

PROVENÇAL, *pro vahN sal',* **LANGUAGE AND LITERATURE,** the form of speech and writings of the people of medieval Southern France, particularly of the region called Provence. In the early part of the Middle Ages Provençal poetry (see TROUBADOUR) had considerable vogue in Europe, and there have come down to us the lyrics of more than 400 poets of that school. The Provençal language as a literary medium began to decline about the year 1200, but it never wholly died out, and in the nineteenth century a society of literary men was organized to labor for its restoration and preservation. Many French poets of high rank have figured in this movement, notably Frederic Mistral, who died in 1914. The society is called the *Félibrige,* and its members, the Félibres. The language used by these modern Provençal poets is not that of the medieval troubadours; but represents several modern dialects that have developed from the original tongue of Southern France.

PROV'ERB, a short, pithy sentence which is commonly used and which expresses some truth or some bit of practical wisdom. Sometimes a proverb may be the saying of one man, which has been generally adopted and made a part of everyday speech; far more frequently it is a gradual growth, like the ballad or folk epic, and has been built up by a number of authors.

Every language, so far as known, has proverbs, and frequently the same one is found current among several different peoples. In some instances these may all be traced to a common source, or at least a common source may be inferred; but in other cases similar experiences and observations by widely separated peoples account for the similar proverbs. Thus, Sterne's "God tempers the wind to the shorn lamb" is identical in sentiment with the old Turkish proverb "God makes a nest for the blind bird," with which it was probably not at all connected in its origin.

The Bible contains an entire book of Proverbs (which see), and many of those which are most common are from that book, as—

Stolen waters are sweet.
Hope deferred maketh the heart sick.
A soft answer turneth away wrath.
Pride goeth before destruction.
Heap coals of fire upon his head.

Outside of the Bible, no other book contains so many proverbs as *Don Quixote*. These were not original with Cervantes, but were collected by him from the sayings of the peasants. Franklin in his *Poor Richard's Almanac* made use of many proverbial expressions, some of which he adapted, some of which he coined; and a great number of these are still in general use. The making of proverbs is commonest in the early days of a people's history, and though to-day many epigrammatic statements find a place in books and in newspapers, few of them become widespread enough to be classed as proverbs.

Consult Christy's *Proverbs, Maxims and Phrases of All Ages;* Skeat's *Early English Proverbs.*

PROVERBS, a book of the Old Testament containing a collection of short poems, epigrams and proverbs, known as the "Wisdom Literature" and having for its purpose instruction in the choice of wise rather than foolish living. It surpasses all other books in this form of literature. An exquisite example of the poems it contains is that of the *Ant and the Sluggard* (VI, 6-11):

Go to the ant, thou sluggard;
Consider her ways and be wise:
Which having no guide,
Overseer,
Or ruler,
Provideth her meat in the summer,
And gathereth her food in the harvest.

How long wilt thou sleep, O sluggard?
When wilt thou arise out of thy sleep?
Yet a little sleep,
A little slumber,
A little folding of the hands to sleep:
So shall thy poverty come as one that traveleth,
And thy want as an armed man.

The typical proverbs are marvelously clear and forceful in their expression, being written in the Oriental style known as parallelism, as:

A good name is rather to be chosen than great riches,
And loving favour rather than silver and gold (XXII, 1).

Though ascribed by tradition to Solomon, the book of *Proverbs* is thought by modern scholars to have been written by different authors and at different times, and to represent an assemblage of several collections of proverbs.

Consult Davidson's *The Wisdom Literature of the Old Testament.*

304

PROVIDENCE, *prov'idens,* R. I., the state capital and the county seat of Providence County, and the second largest city in New England (next to Boston), is situated thirty-five miles north of the open ocean at the head of Providence River, a tidal arm of Narragansett Bay. Boston is forty-four miles northeast, and New York City is 185 miles southwest. Transportation facilities include direct steamboat communication with New York, Philadelphia, Baltimore, Newport News (Va.), Norfolk (Va.) and Mediterranean ports; the New York, New Haven & Hartford Railroad and electric interurban lines. The population was 224,326 in 1910, and 237,595 (6 per cent gain) in 1920. Of the inhabitants, about seventy per cent are Americans and thirty per cent are foreign born. The latter include Italians, Irish, English, Russians and Canadians.

Parks and Buildings. Providence occupies a site on both sides of the Providence River, about eighteen square miles in extent. In the eastern part of the city a ridge rises 200 feet, separating the valleys of the Providence and the Seekonk rivers. On this elevation are many fine residences and the campus of Brown University. Exchange Place, the civic center, is on the west side of the river. On one side of this large park is the Union Station, which, with approaches, river walls and viaduct, cost $4,400,000. Opposite the station, to the north, upon rising ground, stands the massive white marble Capitol building, completed in 1900 at a cost of $3,200,000. Other buildings about Exchange Place are the city hall, built at a cost of $1,000,000, a handsome Federal building costing $1,300,000, and the state normal school. Among many prominent structures are the courthouse, the state armory, the Y. M. C. A. building, the Athenaeum, the public library and the Cathedral of Saint Peter and Saint Paul (Roman Catholic). Roger Williams is the largest of the city's attractive parks, which have a combined area of 650 acres. In Exchange Place is a soldiers' and sailors' monument, a beautiful fountain and an equestrian statue of General A. E. Burnside. The city has an extensive system of boulevards.

Institutions. In addition to Brown University (which see) and the state normal school, the city has the Friends' School and the Rhode Island School of Design. The principal libraries are the public library, Providence Athenaeum and the libraries of the Rhode Island Historical Society, the Rhode Island Medical Society and the Young Men's Christian As-

sociation. Butler Hospital, one of the first to be established in the United States for the treatment of the insane, occupies splendid grounds in the east part of the city along the Seekonk River. Other important institutions are the Rhode Island Hospital, Rhode Island Homeopathic Hospital, the Dexter Asylum for the Poor, Saint Joseph's Hospital and the state institute for the deaf.

Industry. Providence is an important industrial city; the value of all manufactured products exceeded $267,625,000 in 1920. It is one of the foremost cities in the United States in the manufacture of jewelry and silverware. There are over 300 establishments engaged in this industry, and the annual value of their combined output exceeds $42,750,000. It also stands high in the manufacture of woolen and worsted goods, mechanical tools, textile-mill machinery, files, boilers, engines and screws. Other industries include dyeing and finishing textiles, the refining of gold and silver sweepings, slaughtering and meat packing, and the manufacture of rubber and rubber goods, oleomargarine and furniture. There were in 1920 1,274 manufactories in the city, capitalized at $211,902,000.

Providence is a port of entry whose imports for one year sometimes reach $2,300,000. The city has a magnificent harbor, and prior to 1840 was an important port, but it has inadequate facilities for accommodating the largest freighters. A state pier large enough to dock ocean steamers was completed in 1914, and serious efforts are being made to revive foreign commerce.

History. Roger Williams, seeking but failing to find religious liberty, first in Massachusetts Bay, then at Salem, bought lands west of Narragansett Bay from the Indians, and in 1636, with a small company, settled on the site of Providence. In 1638 he organized here and became pastor of the first Baptist church in America. The burning of the British cruiser *Gaspée* in 1772, near Providence, was one of the first openly-antagonistic acts prior to the War of Independence. The British occupied the town during a part of the war. The city suffered a property loss of $1,000,000 as a result of a severe gale and flood in 1815. Providence became a city in 1832. H.W.M.

Consult Greene's *The Providence Plantations for Two Hundred and Fifty Years;* Powell's *Historic Towns of New England.*

PROVINCE, *prov'ins.* This term, in its Latin form *provincia,* was first used in Roman times, to indicate a conquered district which was governed by an official sent out from Rome. The name came from the same root as the verb *to conquer,* and thus could not be correctly applied to a free and independent state; but this shade of meaning was lost, and in the Middle Ages sovereign states which united to form a greater state frequently made use of the name. Thus Holland after it freed itself from Spain was called the United Provinces. In modern times in certain European countries, as Italy and Spain, a province is one of the units into which the country is divided for purposes of local government.

The Canadian Province. When the term is used without qualification in North America, it is understood to refer to one of the divisions which go to make up the great Dominion of Canada. There are nine of these, in addition to the two territories. Some of them are very large; one has an area of little more than two thousand square miles; but the greatest one has no more right to be considered a sovereign state than the smallest. In all essential matters of government they are alike, and each has precisely the same relation to the central or Dominion government. For a discussion of the government of a province, see the article CANADA, subhead *Provincial Government,* page 1119; see, also, subtitle *Government* in the articles on the various provinces.

Necessity for Such Divisions. Before taking up the study of a province as a political unit the pupil will want to know the reason for the division of the country into such comparatively small districts. The provinces did not simply "happen;" various causes, political, geographical, historical, determined the boundaries, to be sure, but the necessity for such a subdivision has been proved by the history of centuries. No large country can be successfully governed as a unit.

Even though the capital of the country were placed exactly in the center and were given excellent communication with all parts of the country, the hundreds of thousands of square miles which make up Canada could not be properly governed from that one point. Close to the capital, no doubt, the system would be most efficient, every one would find his interests protected and his rights assured. But in distant regions the supervision would be certain to relax and the firm control to cease, and this would be increasingly the case as the distance from the governing center became greater. Division into provinces has been found to do away with this difficulty.

Outline on the Province

I. Location

(1) Latitude
(2) Longitude
(3) Boundaries
  (a) Natural
  (b) Artificial

II. Size

(1) Length
(2) Breadth
(3) Area
  (a) Actual
  (b) Compared with that of states and other provinces

III. Physical Features

(1) General surface facts
  (a) Mountains or hills
  (b) Plains
  (c) Watersheds
(2) Effects on climate
(3) Drainage
  (a) Rivers
  (b) Lakes

IV. Climate

(1) Conditions that might be expected, owing to latitude
(2) Variations and their cause
(3) Rainfall
(4) Healthfulness or unhealthfulness

V. Resources and Industries

(1) Minerals
  (a) Varieties
  (b) Location
  (c) Rank among provinces
(2) Agriculture
  (a) Crops
  (b) Stock raising
  (c) Dairying
  (d) Rank among provinces
(3) Fisheries
  (a) Sea or inland
  (b) Rank among provinces
(4) Manufactures
  (a) Principal articles produced
  (b) Rank among provinces

VI. Transportation and Commerce

(1) Railways
(2) Rivers and canals
(3) Commercial centers
(4) Value of trade

VII. The People

(1) Population
(2) Density
(3) Race
  (a) Native Canadians
  (b) Foreign born
(4) Rate of increase
(5) Special characteristics

VIII. Government

(1) Departments
  (a) Executive
  (b) Legislative
  (c) Judicial
(2) Representation in Dominion Parliament
(3) Special features
(4) Provincial institutions

IX. Education and Religion

(1) Public school system
(2) Institutions of higher learning
(3) Churches represented
  (a) Dominant religion

X. History

(1) Exploration
(2) First settlements
(3) Interesting events
(4) Admission to Dominion
(5) Recent progress

That this efficiency of administration is the true reason for the creation of provinces may be seen from the fact that the Dominion government takes over only such rights and such powers as the best interests of the provinces demand. In such matters as affect the people in their relation to the province the central government yields its control to the provincial authorities, assuming the direction only in such matters as concern all the people of all the provinces. In effect, each province is the supreme authority so far as the everyday needs of its people are concerned.

Study of a Province. Like any other geographic unit, the province can be studied properly only with the aid of an outline. Each province has individual features which distinguish it from all other provinces, but the method of study for all is similar, and the accompaning outline will serve for all.

PRO'VO, UTAH, the county seat of Utah County and a prosperous trade center, situated north of the center of the state, three miles east of Utah Lake and forty-eight miles south and east of Salt Lake City. In 1910 it had a population of 8,925, which had increased to 10,303 (15 per cent gain) in 1920. The city is on the Provo River, and on the Denver & Rio Grande and the San Pedro, Los Angeles & Salt Lake railroads. An interurban electric line extends to Salt Lake City. Provo occupies an area exceeding eleven square miles, and is located in the midst of beautiful scenery, in a fertile valley at the base of the Wasatch Mountains.

Agriculture, fruit growing and cattle raising are the chief sources of income. There is a good trade in farm produce, live stock and lumber, and there are manufactories of woolen goods, confectionery and tin and iron roofing. The city has the Brigham Young University, Proctor Academy, a Mormon tabernacle, a Federal building, county courthouse, Carnegie Library, the United States reclamation office and the state insane asylum. There are several parks, and near by are places of scenic interest, including the Provo Canyon, Mount Timpanogas (12,000 feet high) and Bridal Veil Falls. Provo was settled in 1849, chartered as a city in 1851 and in 1910 adopted the commission form of government. H.N.

PROXY, *proks'i.* To vote by proxy is to vote by means of a legal substitute. If a stockholder in a corporation is unable to attend a meeting of the corporation in a distant city, instead of foregoing his right to vote he may

send a formal request to some other stockholder asking him to vote in his place. This is called *voting by proxy.* The person who casts the vote is called a *proxy,* and the paper which authorizes him is also known by the same term. Two of these papers must be drawn up, one for the person represented and one for the proxy.

Voting by proxy is a very old custom; it originated in the House of Lords in England, but there it came to be very much abused and was finally abolished. During the reign of Charles II, to cite an instance of such abuse, the absence of peers from the meetings had become so flagrant that the Duke of Buckingham would frequently arrive at a session with twenty proxies. In order to put a stop to this practice, it was first ruled that no peer could bring more than two proxies, and in 1868 the custom was abolished.

The use of a proxy is now confined almost entirely to business meetings. In England all creditors in a bankruptcy may vote by proxy. In the United States and Canada it is most commonly used by the small stockholders of large corporations, each of whom has a right to vote but may be unable to attend meetings. Occasionally a number of stockholders will authorize some one to represent them for a period of years. Stockholders of national banks may vote by proxy, but no officer, clerk, teller or bookkeeper of the bank may act as proxy. Voting by proxy is absolutely forbidden at all political elections instituted by law, although an informal voting by proxy is practiced at political conventions. Marriage by proxy in the past has not been unusual, particularly in the case of royalty, but it is rare to-day. Sometimes it happens that a woman is to marry a man in some far distant country; it is desired that marriage shall take place and neither can travel so far for the ceremony. In such a case the man in due form may authorize a friend to act as his proxy, and the marriage can thus be solemnized. A.C.

PRUNE, *proon,* a plum which has been dried in the sun. In the western part of America all plums suitable for drying are called prunes while they are still on the trees, just as in some localities cucumbers are called pickles while they are still on the vines. Plums suitable for drying are those varieties which contain more than twelve per cent of sugar. There was a time when the finest dessert prunes were nearly all grown in France, but now California is at least a close second in production for commercial uses. The most famous French prunes come from the valley of the Loire; they are a golden yellow, nearly transparent fruit, and are very expertly dried and attractively packed. Spain and Portugal, Germany, Bosnia and Serbia and also South America and Australia all produce prunes.

The three states of California, Washington and Oregon now produce more prunes than all the above countries put together, although prune-growing was not introduced into California until 1856 and did not at first make rapid progress. Luther Burbank has been successful in developing fine varieties of plums, and is in part responsible for the immense success of this industry in America. Some of the very finest plums are produced in California because the weather in the southern part of the state is more uniform than in other sections, and all of the prunes produced are entirely sundried. Those dried by artificial heat are somewhat inferior. Prunes are nourishing and are so wholesome that the juice of the cooked fruit and the strained pulp may be given to very young babies. As food they are not a great heat producer; their value in this respect is a half greater than that of apples and twice as great as that of peaches. See Food, subhead *Chemistry of Foods.*

PRUNING, *proon'ing.* If you are observant you will see that trees having thick foliage often shed leaves through the spring and summer, though the general leaf fall does not come naturally until autumn. The leaves that are cast off early are usually found on the inside of the crown, where they cannot obtain sufficient air or water. This early leaf fall is a natural pruning on the part of the tree, and it is typical of what nurserymen and owners of orchards and gardens are doing all the time on a larger scale.

Artificial pruning—the cutting away of parts of branches, stems, buds, shoots or roots—is for the general purpose of improving cultivated plants. A branch broken off by a windstorm is cut away that a new one may grow in its place. Shrubs and trees in parks and landscape gardens are pruned so they will have a more attractive appearance. Under the care of a skilful gardener evergreens assume such fanciful shapes as beasts and birds; apple trees are made to grow like vines, and grapevines are transformed into shrubs that grow upright and are self-supporting.

Transplanted trees and flowering plants have to be pruned at the top until the roots are se-

curely established, to prevent too great a loss of water through the leaves. Fruit-producing plants must be kept from putting forth too many buds. Larger and better fruits result when the nourishment from the plant is concentrated in a few vigorous buds, and this principle holds true for flowering plants. The extraordinary specimens of fruits and flowers often seen in exhibitions are produced by careful pruning during the budding season. It has also been found that pruning is often necessary to permit proper spraying of plants threatened with disease. Large wounds left in plants by the pruning knife should be covered with paint to protect the exposed areas from insect pests, fungus spores and bacteria.

Consult Bailey's *The Pruning Book.*

PRUSSIA, *prush'a,* in German, **PREUSSEN,** *proi'sen,* was the largest of the four kingdoms, which, with twenty-two smaller divisions—grand duchies, duchies and principalities—formed the German Empire. Of all of the German states

TERRITORY LOST TO PRUSSIA

The entire black area shows the Prussia of 1914. The peace treaty of 1919 gave to Poland the long, narrow area between the white lines in the east. More land may later be lost in Schleswig-Holstein.

it was the most important economically, politically and historically. After 1871 its king was the German emperor, and its capital, Berlin, was the seat of the government of the Empire. The name Prussia is derived from the Slavonic *Po-russia,* meaning *near Russia,* which was given to the provinces, East and West Prussia, on the Russian border.

The kingdom, embracing three-fifths of all Germany, and including thirteen states and the city of Berlin, almost entirely surrounded the grand duchies of Mecklenburg and Oldenburg, the duchies of Anhalt and Brunswick, the principalities of Lippe and Waldeck, and the free towns of Hamburg, Bremen and Lübeck. Including Hohenzollern, a principality of 441 square miles in the south of Germany, which belonged to it politically, its area was 134,650 square miles. When Germany signed the treaty of peace in 1919 Prussia surrendered some territory to Poland; it now has 113,852 square miles.

The growth of the kingdom, its supreme position in Germany and its importance as a world power were the result of "Frussian militarism"—the development of a great and well-organized army by universal service and iron-bound military policies. It was this vaunted Prussian principle that led the country to ruin.

The People. Almost two-thirds of the people of the Empire are inhabitants of Prussia. The population, exceeding 40,000,000 before the War of the Nations, was but slightly less than the total population of England, Wales and Ireland under normal conditions. The inhabitants include the High Germans of the southwestern uplands and the Low Germans of the northern plain, besides many Poles, Czechs, Wends and Mazurs in the eastern provinces, and Danes, Dutch and Frisians in the northwest, who, together with other non-German races, number about 4,000,000. At the 1919 census it had 37,075,240 people.

The rural population has been steadily decreasing, owing to the great industrial development in the urban centers, and over one-half of the population now live in cities. Berlin, the fifth city in the world in population, has over 3,803,000 inhabitants; Cologne, Breslau, Frankfort-on-the-Main, Düsseldorf, Charlottenburg, Hanover, Essen, Magdeburg, Dortmund, Königsberg, Stettin, Neukölln, Duisburg and Kiel are cities with a population of over 200,000 each.

Relation between the Land and the Industries. Prussia may be divided into two distinct sections—the great northern plain, the granary of the Empire, and the southwestern highlands, important for their mineral wealth and scenic beauty. About three-fifths of the kingdom lies within the vast, low plain of Central Europe, which slopes gently toward the Baltic Sea. The western region bordering the North Sea is a flat, marshy pasture land, and, unlike the rest of Prussia, is almost bare of trees. It is noted for its dairy farms and fine horses, a large part of the mounts for the German cavalry being furnished by Hanover. This section contains the chief ports of entry for western trade and tourists, and it is crossed by two of Germany's great rivers, the Weser and the Elbe.

Prussia's coast extends over 1,100 miles on the North and Baltic seas, the smaller states of Oldenburg and Mecklenburg and the free cities of Bremen, Hamburg and Lübeck being the only other divisions of Germany bordering the sea. Consequently, it occupies the most conspicuous position in Germany's commerce and fisheries.

The eastern plain bordering the Baltic is a region of extremes of temperature, and it has few resources and a scanty population. Its main crop is potatoes, which constitute one of the chief foods of the peasants and are used also in the manufacture of alcohol for fuel, motive power and light. The low, sandy coast is bordered by numerous *haffs* or shallow lagoons, and is separated from the inland by a belt of forested and lake-studded hills. At the mouths of the Oder and the Vistula, the two great rivers of this eastern section, are situated Stettin and Danzig, the chief ports on the Baltic.

The central section of the plain is a region of lakes and waterways and is the site of Berlin and others among Germany's great industrial cities. The valley of the Oder is the most fertile region of Prussia and produces great quantities of cereals, especially rye; three-fourths of Germany's total product comes from the fields of Prussia.

The prosperous farmer of the great rye fields of Prussia builds his house of brick or stone. It is a wide, rambling structure a hundred feet in length, having a steep roof of tile or thatch beneath which are stored forty or fifty tons of rye or hay. The floors are paved with cement or round stones, and the ceiling is beamed with heavy, smoke-darkened rafters, from which hang hams and sides of bacon which are cured by the smoke from the hearth.

The Rhine provinces, where the birds sing in the blossoming fruit trees when the snow still whitens the fields of Eastern Prussia, is the vineyard of Germany. Along the banks of the Lower Rhine there are important manufacturing cities, such as Essen, the home of the great Krupp Works, Dortmund and Elberfeld. In the highlands to the south are the greatest coal mines of Germany, and other metals, including iron, silver, copper, nickel and lead, are mined there, Prussia leading all the German states in the production of minerals.

The geography, separate industries, transportation and commerce are further described in the article on GERMANY.

Government and History

Prussia was the all-powerful state in the German Empire, because it was the largest, the richest, the most aggressive. Also it was dominant because the king of Prussia was the hereditary emperor of the country as it existed until November, 1919. The new government of Prussia, under the republic established after the overthrow of the monarchy, had not announced a definite program as late as September, 1919. There were indications that the old legislative order would be but little disturbed, except that all evidences of royalty would disappear.

The old law-making body was the *landtag,* composed of two chambers of equal power. The upper house comprised members of the nobility, peers, university professors, Protestant church representatives and representatives of cities. The members of the lower house were citizen taxpayers who were elected by popular vote.

A distinctive feature of Prussian provincial government was the separation of local affairs into two classes; the general activities, such as schools, police, and worship, were administered by government officials, and purely local activities, such as highways and local institutions, by local officials.

The Foundations of the Kingdom. The history of Prussia is a story of the great House of Hohenzollern, which has ruled it from its earliest beginnings. In the fifteenth century, Frederick of Hohenzollern, an ancestor of William II, was made the Elector of Brandenburg, a vassal state of the Holy Roman Empire. The duchy of East Prussia, which had been a subject state of Poland, was added to the possessions of the Hohenzollerns of Brandenburg in 1618, and other territories were acquired by the Great Elector Frederick William (1640-1688); under him the scattered possessions were united, and Brandenburg became the leader of the Protestant states of North Germany. He was the first of the three great rulers who laid the foundation of the great military power of modern Prussia.

The Establishment of the Kingdom of Prussia and Its Rise in Power. In 1701 the Holy Roman Emperor Leopold I, anxious to secure the aid of his vassal princes in the War of the Spanish Succession, established a kingdom in Brandenburg and Prussia, and Frederick III, the son of the Great Elector, was crowned Frederick I, "king of Prussia." The second

Outline and Questions on Prussia

I. Location and Size

(1) Northern part of old empire
(2) Geographic relation to other German states
(3) Area
  (a) Actual
  (b) Comparative

II. Physical Features

(1) Two well-marked regions
  (a) Northern plain
    1. Part of great plain of Central Europe
    2. Coast line
    3. Important western section
    4. More barren eastern section
    5. The central plain and its resources
  (b) The southern highlands
    1. Great mineral resources
(2) Drainage
(See GERMANY)

III. The People

(1) Population of Prussia includes nearly two-thirds of the inhabitants of Germany
(2) Compared with that of other countries
(3) Races
  (a) High Germans
  (b) Low Germans
  (c) Non-German peoples
(4) Cities

IV. Government

(1) Legislative branch
  (a) *Landtag* of two houses

V. History

(1) Its beginnings
  (a) Importance of Hohenzollerns
(2) The Great Elector
(3) The kingdom established
(4) Rise to power
  (a) Frederick the Great
  (b) Partitions of Poland
(5) Napoleonic era
(6) Bismarck's achievements
(7) Establishment of German Empire

Questions

Who was the greatest man in Prussian history during the seventeenth century? The eighteenth century? The nineteenth?

What does the name *Prussia* mean?

What is militarism, and what part has it played in the history of this country?

How large a proportion of the inhabitants of Germany live in Prussia?

Where do most of the horses of the German cavalry come from?

How does Prussia's largest city rank in size among the cities of the world? (See CITY.)

How many miles of sea coast has Prussia to each 1,000 square miles of area? How does it compare in this respect with France?

What territory did Prussia lose by the 1919 treaty of peace?

king of Prussia was Frederick William I, who left an army of 80,000 of the best-trained troops in Europe and a full treasury to his son, Frederick II, called the Great.

The first part of the reign of this great and absolute sovereign was given up to successive wars with Austria for the possession of Silesia. The latter part of his reign was a period of political reorganization and development of the resources of the kingdom, and the progress of Prussia awakened all of Germany to new life and patriotism.

In the first partition of Poland among the European powers, the larger part of the province of West Prussia was added to the kingdom, thus uniting Brandenburg, Pomerania and East Prussia. The next king, Frederick William II, who came to the throne in 1786, lost to France the Prussian territories west of the Rhine, but during his reign the kingdom profited by the second and third partitions of Poland.

In the reign of Frederick William III, who succeeded to the crown in 1797, Prussia was crushed by the forces of Napoleon, but through the aid of strong ministers and an awakened people the state rose against its oppressors, and in the final coalition wars against Napoleon Prussian soldiers rendered valuable service. Frederick William IV, who reigned from 1840 to 1861, was reactionary in his tendencies, but in 1848, when the tide of democracy rose high throughout Europe, he was forced to grant the people a constitution. Upon the accession of William I, in 1861, Bismarck became the dominant figure in state affairs. How he brought about the formation of the late German Empire, with Prussia at the head, is told in these volumes in the biography of the statesman, on page 752. William II was the last king of Prussia and the last of the Hohenzollern dynasty. See WILLIAM II.

Consult James' *Principles of Prussian Administration;* Von Bülow's *Imperial Germany;* Reddaway's *Frederick the Great and the Rise of Prussia.*

Related Subjects. The following articles in these volumes may be consulted in connection with a study of Prussia. For geographic features and for the later historical development, see lists with article GERMANY.

CITIES

Aix-la-Chapelle	Cassel
Altona	Charlottenburg
Barmen	Cologne
Berlin	Danzig
Bonn	Dortmund
Breslau	Duisburg

Düsseldorf	Königsberg
Elberfeld	Krefeld
Ems	Magdeburg
Erfurt	Münster
Essen	Osnabrück
Frankfort-on-the-Main	Posen
Frankfort-on-the-Oder	Potsdam
Halle	Stettin
Hanover	Wiesbaden
Kiel	Wittenberg

HISTORY

Bismarck-Schönhausen, Prince	Hohenzollern
Frederick I and II	Holy Roman Empire
Frederick William, the Great Elector	Poland
Frederick William I, III and IV	Seven Years' War
	Succession Wars
	William I

PRUSSIC ACID, or **HYDROCYANIC ACID,** *prus'ik, hi dro si an'ik,* a compound of hydrogen and cyanogen (which see). It is called *prussic acid* because it was first obtained from Prussian blue. The pure acid is a clear liquid, so volatile that if a drop of it is placed on glass a part of the drop will be frozen by the cold produced by the rapid evaporation of the liquid. Prussic acid has the odor of peach blossoms or bitter almonds, and is one of the most poisonous substances known in either liquid or gaseous form. A drop placed in the eye will cause almost instant death. Its most important compound, potassium cyanide, is extensively used in extracting gold from ore by the cyanide process. See GOLD; METALLURGY.

PSALMS, *sahmz,* one of the books of the Old Testament, containing the religious poetry of the Hebrews, including the hymns and prayers used in public worship. There are 150 psalms, divided into five books, each of which ends with a doxology, as:

> Blessed be Jehovah, the God of Israel,
> From everlasting to everlasting,
> Amen and Amen.

The Psalms are recognized by all critics as perfect lyric poems, both in their form, which is largely that of parallelism, and in their outpouring of the finest emotions of the human soul. The Twenty-third Psalm, written by David in remembrance of his early life among the sheepfolds, beginning, "The Lord is my shepherd, I shall not want," can probably be repeated by more people than any other fragment of poetry. Psalm CXXI, given below (according to the Revised Version), illustrates the simple yet lofty style of the Psalms:

I will lift up mine eyes unto the mountains:
From whence shall my help come?
My help cometh from Jehovah,
Who made heaven and earth.

He will not suffer thy foot to be moved:
He that keepeth thee will not slumber.
Behold, he that keepeth Israel
Shall neither slumber nor sleep.

Jehovah is thy keeper:
Jehovah is thy shade upon thy right hand.
The sun shall not smite thee by day,
Nor the moon by night.

Jehovah shall keep thee from all evil;
He shall keep thy soul.
Jehovah shall keep thy going out and thy coming in,
From this time forth and forevermore.

The authorship of the Psalms is a matter of dispute. Popularly they are believed to be largely the work of David. See BIBLE, subhead *The Old Testament,* page 705.

Consult Prothero's *The Psalms in Human Life;* Schmidt's *The Messages of the Poets.*

PSEUDO-SCIENCES, *su'doh.* See SCIENCE AND THE SCIENCES, subhead *Pseudo-Sciences.*

PSYCHE, *si'ke,* in Greek mythology a princess whose beauty was so great that it aroused the jealousy of the goddess Venus, who called her son Cupid and ordered him either to kill Psyche or to make her fall in love with some

PSYCHE AT NATURE'S MIRROR
From the painting by Hulmann.

hideous wretch. When the youthful god saw the beautiful maiden, he fell in love with her himself and made her his wife. He kept her in a beautiful palace and visited her every night, but she never saw him, for he had told her that

if she once looked upon him he should be obliged to leave her forever. For a long time they were very happy, but at last Psyche's jealous sisters convinced her that her invisible husband was a frightful monster and persuaded her to kill him in his sleep. That night Psyche crept up to him with a lighted lamp in one hand and a dagger in the other; and when, by the light of the lamp, she saw the beautiful god, she was so startled that a drop of the burning oil fell upon his shoulder and awakened him. Seeing her standing over him with her dagger, he guessed her intentions and with a reproachful word vanished out of sight, leaving her distracted with grief.

Far and wide she sought him without avail, and many were the difficult tasks that were laid on her by Venus. At last she was sent by this hard-hearted deity to the underground realm to obtain from Proserpina some of the latter's fabled beauty. On her return journey curiosity overcame her and she opened the box, only to be overcome by poisonous fumes. Cupid came upon her as she lay asleep by the roadside, forgave her, and after much pleading reconciled his mother to the reunion and took her up to Olympus, where she was made immortal. As Cupid represents the heart, Psyche was thought to typify the human soul, and the trials through which she went were symbolic of the struggles through which the soul must go before it is made pure. References to Psyche in literature are very numerous, and it is almost impossible to read any of the poets without coming upon some mention of her. See BUTTERFLY, subhead *Life History,* page 1023.

PSYCHICAL, *si' ki kal,* **RESEARCH.** The term became current in 1882 through the establishment in England of the Society for Psychical Research for the investigation chiefly of phenomena suggestive of the operation of powers beyond the recognized use of the senses and the accredited behavior of matter and mind. The investigation was to include the traditional beliefs in premonitions, haunted houses, the happenings in the presence of mediums, such peculiar states as trance, hypnosis and the existence of seemingly supernatural forces transcending the known behavior of matter. This program may not seem wholly scientific, but it corresponds to widespread interest in certain classes of occurrences, whatever their nature and explanation; these require special methods of investigation, and their proper comprehension is a legitimate function of educational interest.

The most definite problem was that of the transference of thought apart from the ordinary channels, for which the term *telepathy* was adopted. Persons appeared claiming such powers; experiments were conducted on a large scale in which the successes of such "percipients" in guessing numbers, names or cards were carefully recorded, and the conclusion reached that after allowing for chance a proportion of success remained that implied an authentic transfer. Although critical students have subscribed to these conclusions, they cannot be said to be generally accepted; on the contrary, the prevailing attitude of scientific men is that the conclusion is unwarranted. Of the elements that may account for the results, the most perplexing is the question of fraud, intentional and unintentional. Distinctly fraudulent methods were discovered by members of the society, and such results were disregarded; but it is true in a number of cases that confessions of fraud were made after the results had been accepted as genuine. Apart from the "money" interest the desire for notoriety and the interest in deception act as motives for frauds. It has also been found that involuntary whisperings and all manner of subtle indications were subconsciously conveyed, and may afford a clue to the successes as well as to the methods employed. In such experiments the proper allowance to be made for chance is not easily determined; the mental habits of two persons may be sufficiently alike to cause apparent transfer.

A truly formidable amount of evidence was amassed of "veridical" premonitions and apparitions, that is, such as correspond to actual happenings. A person at a distance has a sudden and strong feeling that something momentous is happening to a friend; quite as commonly an actual feeling of his presence or the apparition of a form is reported. Later reports in many cases prove that something momentous had really occurred, and in many cases the premonition or apparition fairly coincided with the moment of death of the absent friend. To this class of cases the theory of telepathy was applied. Such cases offer large room for sincere error: the coincidence is often exaggerated; the remarkable details are in some cases illusions of memory; the negative instances are ignored; the fact that persons in positions of danger are naturally frequently in mind of their friends, would favor coincidences of thought and occurrence; some such coincidences must occur by chance; cases depending upon written records made before verification are rare.

Much reliance has been placed, by those who accept the evidence, upon the accuracy of details, some seemingly unknown to the percipient until the moment of the premonition or apparition. Some favor the hypothesis of a spirit communication to account for the reports as rendered. Evidence of this type depends wholly upon the accuracy, scientific habits of observation and freedom from bias of the recorders. A scientific view must conclude, in view of the contradiction which such a view presents to known action of physical and mental agencies, and in view of the extreme uncertainty of the evidence and of the negative result of experimental proofs, that the case is not proven and inherently weak. The census of hallucinations, upon which some of the conclusions are based, suggests at once the tendency of favorable cases to be reported, and has established that such phenomena are by no means uncommon in normal individuals. That there may be a tendency among those of nervously unstable temperament to invite or favor such phenomena and to find satisfaction in attaching significance to them, is conclusively established.

An interesting and more decisive branch of investigation includes the physical phenomena, occurring mostly in the presence of spiritualistic mediums, such as the mysterious movements of objects, the writing on slates apparently out of control of the medium, answering of questions in sealed envelopes, materializations, spirit photographs, etc. (see SPIRITUALISM). Substantially all of these were found to be fraudulent, and some questionable cases have since been exposed. The investigation has not been without result in showing the wide prevalence of a willingness to deceive (quite apart from self-deception), and particularly in showing how slight a departure from accuracy of description is sufficient to make a miracle out of a plain tale, and what expert knowledge is required to detect the fraud in operation.

The investigation of haunted houses, especially the cumulative account of different observers, is too complex to be summarized. It has convinced some, and seems inconclusive and suggestive of delusion to others. The persistence of such accounts even in skeptical days is not without interest.

Of a different type are the revelations of mediums in a trance state, usually of affairs of deceased individuals or of living ones, seemingly beyond their knowledge by any ordinary channels; often private matters of an intimate character, upon which reticence is most natural, are thus revealed. It is to be noted that such revelations are made by a few individuals, often under questionable circumstances, involving at once the suspicion of lack of good faith or of hysterical varieties of deception. The largest mass of testimony has accumulated through the sittings of Mrs. Piper, whose method is to go into a trancelike state and answer questions as well as offer information both as to the living and the departed, seemingly beyond the possibility of ascertainment by Mrs. Piper herself. Communications with those recently departed and interested in the reality of such phenomena are recorded. Spirit communication has been accepted by some investigators as the only adequate hypothesis; while others regard telepathy as adequate. It is clear that, unlike material phenomena which can be examined and exposed, this type of evidence depends wholly upon the coöperation of the "medium," who as a rule has been unable or unwilling to furnish such enlightenment. Under these circumstances and in view of the baffling complexity of the evidence and the openings which it offers for all manner of deception, no other value can be attached to it than that of an interesting psychological manifestation.

The problems of psychical research have included a miscellaneous group of exhibitions of unusual powers, of which "crystal gazing" is an example. The ability of favored individuals to promote subconscious images and by this means to project in pictures seen in the surface of a glass ball incidents seemingly beyond the normal knowledge, is unmistakably established. Those convinced of the telepathic or similar action see in these revelations additional proofs of their views. That the action falls in line with what is known of subconscious mechanisms is the more scientific hypothesis. While the source of the images cannot be traced in many instances, a generous allowance for the intricacy of mental action will bring the results within the normal behavior of subconscious intelligence. The same applies to "automatic writing" in which the medium of expression is either a pen or pencil or the spelling out of sentences letter by letter on a board (ouija board) on which the letters are alphabetically arranged, and the hand of the agent rests upon a small tripod which moves and rests upon one letter after another. Poems, narrative, answers to questions have been thus revealed.

In reviewing the wide range of the problems of psychical research it becomes evident that most of them pertain to the same powers as

dominate the history of occult pretensions, as clairvoyance, the power to control matter at a distance and defy the laws of physics, spirit revelations, oracles or revelations of intimate information not readily accessible, haunted houses, apparitions, trance states, and the like. The presumption remains that the methods and agencies responsible for such appearances in the past (which have been proved to be vain pretense or capable of reasonable explanation within the accepted range of scientific hypothesis) are also adequate to account for the much more circumstantial evidence recently accumulated.

This conclusion remains the present verdict of a scientific caution. Nor can there be any doubt that the interest in establishing the reality of these exceptional forces, however tinged or corrected by a scientific faith and training, is after all much of the same order as sustained the beliefs of past ages and gave rise to much superstition. The newer interest that these investigations have furthered is the psychological one in the operation of subconscious states, and in the allied mechanisms by which the possibilities of explanation and rationalization have been substantially enlarged. In many cases it takes an emotional interest in the truth of a certain hypothesis (spiritualism) to bring about the wayward and irregular manifestations; that they may occur without this interest is a valuable corroboration of the "subconscious" explanation.

Whether one believes that the enormous labor expended in the accumulation of these data has been worth while depends upon the significance attached to the results. The issue seems to be between (1) the view of the universe on the one hand as for the most part regulated by well-ascertained laws of cause and effect in the field of mind and matter, while exceptionally and under peculiar circumstances, at the agency of favored individuals, quite another realm of action takes place transcending or defying these laws and revealing relations unrecognized in ordinary science, and (2) the view that holds firmly to the all-encompassing scope of science, and holds that the seeming exceptions may eventually be accounted for by extension (particularly in the domain of subconscious mechanisms) of known forms of material and mental action. The decision is likely to be determined by predilections and training; in reaching it an important factor is the allowance to be made for coincidence and the scope of fraud and self-delusion. J.J.

Relating to Various Beliefs. The following articles, while all do not bear directly on psychical research, are of interest in this connection:

Alchemy	Occult
Astrology	Palmistry
Clairvoyance	Phrenology
Conjuring	Physiognomy
Demonology	Psycho-Analysis
Divination	Spiritualism
Faith Cure	Subconscious
Hypnotism	Suggestion
Magic	Superstition
Medium	Telepathy
Mesmerism	Theosophy
Mind Reading	Trance
Necromancy	Witchcraft

PSYCHO-ANALYSIS, *si'ko a nal'i sis.* The term refers to recent methods of detecting the source of mental difficulties by an analysis of deep-seated subconscious conflicts (see SUBCONSCIOUS). In many cases impediments in action, troublesome thoughts, and failures of adjustment (as well as isolated symptoms such as a recurrent hallucination, stuttering, a feeling of losing consciousness, a pain, a paralysis) have been shown to result from a mental scar left by an emotionally upsetting experience.

Many of these cases occur among hysterical patients. Freud, who is the founder of these views, says that hystericals suffer from their memories. Seemingly they get over an emotional shock; but this leaves a liability like a scar, and any succeeding emotional disturbance sets off the original experience. It may be that cases of altered personality owe their origin to such an original shock. In a very simple case a nervous girl at the adolescent period had a chill and spasm while bathing in a stream; this left behind a constant tendency to go through the spasmodic movements under the least excitement. The attacks were so constant that they interfered with any continuous occupation.

Most of the cases are very complex and consist of mental fears, hesitancies, hallucinations, anxieties, disqualifications, the source of which often remains obscure until revealed by psychoanalysis. Once rendered explicit and conscious, they are more readily opposed and conquered. What is characteristic is that such difficulties often seem real and physiological in nature; they prove to yield to mental treatment. In the procedure the subject is asked to assume a passive state and tell all that occurs to him in the account of his symptoms; one train of ideas leads to another until a clue is found. Such clue is often found in dreams, because a dream is an uncensored product, and according to

Freud expresses an unfulfilled wish. It is these inner conflicts, repressions and antagonisms that cause mental maladjustment. Many of these are of a deeply-personal and emotional nature, and naturally center about the life of sex.

Psycho-analysis has also been applied to other types of suppressions, such as those of guilty action and the detection of criminals. Here the favorite method is that of association. A list of words is prepared, most of them of ordinary significance, and the time noted for each such word to arouse an associated word. These times vary, but not extremely. Here and there a clue-word or suspected word connected with the repressed idea (crime) is inserted; and the response is found to be delayed. By the analysis of such lists the clue is found and followed. The same procedure is applied to the cases of internal impediment and conflict above described.

Psycho-analysis is but one of several methods useful in unraveling motives which lie deeply imbedded in subconscious entanglements. Its recent popularity is due to the fact that so many forms of nervous disability have been baffling, and here alone in the mental realm find their solution. The operation of release—suggesting that of confession in the Church—also emphasizes the principles that strong emotional impulses and instinct must find expression, or in their repression may do damage. This principle is of significance for educational and social measures. Unless forms of outlet are supplied for the strong passions of men, unwholesome ones will develop. The transformation of old impulses to new outlets is thus seen to be the problem which civilization imposes upon the nervous system. The disqualifications which psycho-analysis is called upon to treat represent the price that is paid in failures to meet these radically changed conditions of life.

Relating to Various Beliefs. For a list of topics of interest in this connection, see PSYCHICAL RESEARCH, above.

PSYCHOLOGY, *si kol' o ji,* the science which studies and explains the workings of the mind. It is only since the middle of the nineteenth century that men's knowledge of this science has been turned to practical use. Previous to that time it was so interwoven with philosophy and metaphysics that it held no interest for students of other subjects or for men and women of affairs. Formerly each form of mental activity was considered a special power or faculty distinct from other forms of activity, and the faculty or power of memory, the faculty of imagination and other faculties were thus treated in textbooks on psychology. There was no attempt to find the connection between mind and body previous to 1850, and the views of the first investigators along this line of research naturally were rejected by the old school of psychologists. But in 1878 Wilhelm Wundt established a psychological laboratory at Leipzig, the first of its kind in the world, and through a series of carefully wrought-out experiments verified the experiments of others. This led to an orderly arrangement of the new discoveries and laid a foundation for further study. Wundt continued his labors, and the value of his work was soon recognized by other psychologists, so around his discoveries there developed a new science of psychology, more human, more real and more practical than had been known before.

Wundt has justly been called the father of modern psychology. Students from his laboratory established similar institutions in other countries until every great university in Europe and America was equipped for the study of experimental psychology. The most celebrated of Wundt's followers in the United States was William James (which see). His *Principles of Psychology,* which appeared in 1890, was an epoch-making work, and at once attracted the attention of leading psychologists throughout the world. James vitalized psychology and attracted to its study thousands who had hitherto considered the subject dry and impractical. A leading American authority says of him:

> The chief work of James consisted in a reconstruction of psychology by resetting its problems and by exploring old as well as new fields in search of data for their solution. By his rare mastery of English and his keenness for the concrete in experience he turned the abstract difficulties in human subjects into vital interests for the public as well as for students in general.

Modern psychology recognizes the interdependence of mind and body and the localization in the brain of various centers of action, but it draws a sharp line between physiological and mental action. While mental action may control physical, it cannot be transformed into it, neither can physical action be transformed into mental. The branch of psychology given to the study of the relation of mental activities to the nervous system is known as *physiological psychology.*

Modern psychology has discarded the old theory of faculties or powers, but it is difficult to rid the science of terms that have been in use for centuries, and we often find these terms

in work of recent date. The mind is considered as a unit, with the power of acting in various ways to secure specific results. Instead of a faculty of memory, for example, the mind acts to recall past experiences, and in connection with this special form of activity other activities may be present, as feeling and will, but so long as the person is trying to recall past experiences the form of activity which we call memory will be the strongest. This is equally true of other forms of activity. When we speak of will, we mean that activity of the mind which enables us to choose and to act. When we speak of feeling, we mean the activity through which we experience pleasure or pain.

Development of Mental Powers. Modern psychology recognizes the fact that the various forms of mental activity develop in accordance with a fixed law, and that the order of their development never varies. This order is (1) observation, (2) memory, (3) imagination, (4) thought, which includes conception, judgment and reason. Feeling and will are present at birth, and with the other activities increase in strength as the mind develops. A knowledge of these facts is of great importance to the teacher who without such knowledge might set tasks for children which they do not have the mental capacity to perform.

Classification. Psychology is classified in various ways by different authorities, but these classifications are of interest to special students only. We have already mentioned physiological psychology. *Child psychology* is devoted to the study of the mental development of children, and is generally known as *child study*. *Educational psychology* treats of the application of the laws of mental development to teaching. W.F.R.

Consult Tichener's *Beginner's Psychology;* Baker's *Elementary Psychology;* Watson's *Behavior.*

Related Subjects. The reader is referred for further treatment of this subject to the articles on the following topics:

Apperception
Association, Law of
Attention
Brain
Child
Child Study
Concept
Dreams
Feeling
Free Will
Habit
Hallucination
Imagination
Instinct
Interest
Judgment
Memory
Mind
Pedagogy
Perception
Reason
Senses, Special
Suggestion
Thought
Will

The articles on the following psychologists may also be consulted:

Dewey, John
Galton, Sir Francis
Hall, G. Stanley
Helmholtz, Hermann von
James, William
Münsterberg, Hugo

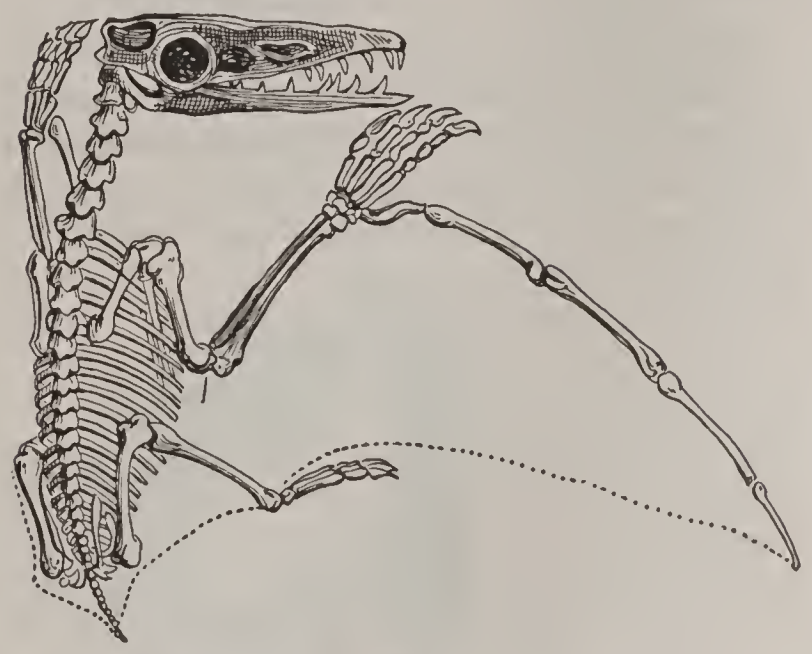
PTARMIGAN, *tahr'mi gan,* a group of birds of the grouse family, found in northern regions of both continents. A characteristic feature of these birds is a covering of short feathers on the feet. Most species have several changes of plumage during the year; the winter coat is a pure white and that of summer a mixture of reddish-brown, buff, gray and black, the coloration serving at different seasons to protect the bird from discovery by its enemies. Ptarmigans nest among mosses on the ground. Their eggs, six to eleven in number, vary in color from cream-buff to reddish, and are spotted and blotched with black or dark brown.

THE PTARMIGAN
About one-tenth actual size.

PTERIDOPHYTES, *ter'i doh fites,* from two Greek words meaning *fern* and *plant,* is the name given to that division of the plant kingdom which includes ferns, club mosses and horsetails, or scouring rushes. It is one of the four grand divisions into which plants are divided (see in these volumes the article Botany, pages 861 and 862). These plants have real roots, but no stem, although the rootstock often resembles one. Many of them are tropical, and in the geological period, particularly in the earth's greatest coal-forming ages, they were far more abundant than they are now. See Ferns; Geology.

PTERODACTYL, *ter o dak'til,* an order of flying lizards that lived in prehistoric times. Numerous fossil remains found in limestone formations of the Mesozoic Age indicate that there were about twenty genera of these oddly-formed creatures. They had hollow bones, like birds, but in other points of structure were like reptiles. The body was short, the head large, and there were two long, slender hind-legs and a pair of forelimbs. A very long tail was characteristic of earlier forms. Probably the most peculiar point of structure was the prolongation of the fifth finger of the forelimb. To this was attached a strong mem-

brane, forming a wing which looked something like the wing of a bat. The jaws of the pterodactyls were provided with teeth and came together in a birdlike beak. In expanse of



SKELETON OF THE PTERODACTYL

wing these animals varied from twelve inches to about twenty feet. See MESOZOIC ERA; FOSSIL.

PTOLEMY, *tol'e mi,* the name of sixteen kings who ruled Egypt from 323 to 30 B. C., constituting the Macedonian dynasty. Only five of them are historically important.

Ptolemy I, surnamed SOTER, or "Savior" (367-283 B. C.), was a Macedonian Greek and a favorite general of Alexander the Great. He possessed much of the genius of Alexander for conquest and organization. After Alexander's death, when the vast empire was divided, Ptolemy chose Egypt and made Alexandria his capital. By marriage and by fighting he extended his territory, and during his reign Egypt became foremost among nations in commerce, the clearing house for the produce of the world. To further this great trade Ptolemy built roads and canals. He was not only a warrior and an organizer, but a patron of learning as well. It was his aim to make Alexandria both the commercial center and the intellectual capital of the world, and to this end he founded the Museum and the great Alexandrian Library. He also extended many privileges to teachers, philosophers and writers. In 285 B. C. he abdicated in favor of his son, Ptolemy Philadelphus.

Ptolemy II, surnamed PHILADELPHUS (308-247 B. C.), was a peace-loving king who accomplished with honor the task of carrying out his father's plans for the commercial and intellectual glory of the kingdom. Among the achievements of his reign were the opening of a canal from the upper end of the Red Sea to the Nile, and the erection of a lighthouse on the island of Pharos (see LIGHTHOUSE). This structure was one of the Seven Wonders of the ancient world. According to tradition, not well founded, Ptolemy had a Greek translation made of the Hebrew Scriptures (see SEPTUAGINT).

Ptolemy III, called EUERGETES, or "Benefactor" (about 282-222 B. C.). Under this progressive ruler Egypt reached the height of its military glory and material prosperity. Ptolemy III was a patron of learning and a famous builder.

Ptolemy V, surnamed EPIPHANES, or "Illustrious" (210-181 B. C.), was crowned when only five years old. The kings of Syria and Macedonia promptly took advantage of this condition and proceeded to divide between them the foreign possessions of Egypt. The infant king's frightened guardians called upon Rome for help. That state, only too eager for an opportunity to interfere, forced the kings to restore most of the lands by arranging a marriage between Ptolemy and the daughter of the Syrian king, who was to have as her dowry the disputed provinces. This aid was the opening wedge for the Romans, whose influence increased until Egypt became a Roman province. The coronation of Ptolemy in 196 B. C. was the occasion for the inscribing of the famous Rosetta Stone (which see).

Ptolemy XIV (about 61-47 B. C.) came to a kingship already under a Roman protectorate, and when he quarreled with his sister-wife, the famous Cleopatra, and drove her from the country, Caesar interfered and deposed him. Ptolemy attempted to assert his rights, but was defeated, and was drowned while endeavoring to escape. See CLEOPATRA for subsequent events.

Consult Mahaffy's *Empire of the Ptolemies;* Budge's *A History of Egypt.*

PTOLEMY, a famous astronomer and geographer of antiquity, whose remarkable theory that the earth is the center of the universe was generally accepted throughout Europe until disproved by the arguments of Copernicus and the astronomers who followed him. Information concerning the life of Ptolemy is meager, but it is known that he was a native of Egypt and that he belonged to that group of scholars which flourished in Alexandria about A. D. 139.

His system of astronomy, which has been named the *Ptolemaic system,* is set forth in the *Almagest,* a ponderous work of thirteen books. This theory views the earth as a globe, around which revolves the hollow sphere of the

heavens, and which, compared with the heavens, is but as the point of a pin in size. Around the earth revolve the moon and sun, but in circles, of which the earth is not the center. Seven planets, arranged according to distance from the earth, are named the Moon, Mercury, Venus, the Sun, Mars, Jupiter, Saturn. To Ptolemy the world owes the invention of the theory of planets and the discovery of the inequality of the moon's motion in its orbit. He was also the only authority of his age on the subject of ancient astronomy.

As a geographer, Ptolemy improved and corrected the works of a predecessor, Marinus Tyrius. His *Geography* consists chiefly of a catalogue of places with their latitude and longitude, together with certain meager descriptive matter. This work was illustrated by a series of twenty-six maps, and a map of the world. The *Geography* was a standard textbook until the great maritime discoveries of the fifteenth century, which thoroughly revolutionized all preconceived theories on the subject. B.M.W.

PTOMAINES, *toh'ma inz,* but commonly called *toh'maynz,* a class of substances formed by the action of bacteria upon organic matter. They are animal alkaloids (see ALKALOIDS), and chemically are compounds of carbon, hydrogen and oxygen. About 200 kinds have been identified. The presence of ptomaines in tainted food is responsible for what is known as *ptomaine poisoning.* Common sources of this malady are canned fish or meats and ice cream which has stood in a tin can for some time. The symptoms of ptomaine poisoning are chilliness, headache, dizziness, pains in the abdomen, and vomiting and purging. Convulsions and coma often occur in cases that end fatally. Treatment consists in cleaning out the stomach and bowels and administering stimulants. All cases should have the care of a physician.

PUBLIC DEFENDER. It frequently happens that a man is accused of an offense against the law and does not have money to employ a lawyer to defend him. In such event, in nearly all courts, the judge will call upon some one to take his case, without expense to him. But the man selected is frequently inexperienced or an unsuccessful lawyer, or is too busy to give the case proper attention; while against the defendant would be the prosecuting attorney, a man given his office for ability, and eager to make a good record. The result would scarcely be justice, or a fair working of the principle that a man is innocent till he is proved guilty.

It was reasoning of this nature which prompted Los Angeles County, Cal., to appoint in January, 1914, a public defender, paid by the state to insure fair treatment to penniless prisoners. In addition, this new type of official is given the tasks of helping working people collect wages and of representing citizens in small lawsuits for which they cannot afford regular counsel; in this he merely takes the place of legal aid societies and other charities.

The Los Angeles experiment has not been widely copied, though it is claimed that it is successful, even to the point of saving money for the state by saving time for the court. Portland, Ore., has a public defender for the police court. In 1917 a system of providing legal defenders for persons accused of crime and unable to pay lawyers' fees was adopted in New York City, under the supervision of a Voluntary Defenders' Committee.

PUBLIC LANDS. See LANDS, PUBLIC.

PUCCINI, *poot che'ne,* GIACOMO (1858-), one of the foremost composers of modern Italian opera. He was born at Lucca, of a family which for over 150 years has produced a number of notable musicians. While he was a student at the Milan Conservatory, he heard his first orchestral work played at the school. His first ambitious composition, the opera *Le Villi,* brought him immediate recognition, but his next effort, *Edgar,* produced in 1889, was a failure because of a poor libretto. In 1893 his *Manon Lescaut* was produced and won immediate success, and *La Bohème,* which followed in 1896, was considered a still greater triumph. *La Tosca, Madame Butterfly* and *The Girl of the Golden West,* produced between 1900 and 1910, show fresh aspects of Puccini's genius. He is appreciated by all classes of music lovers, and *Madame Butterfly,* his masterpiece, and *La Bohème* are favorites with opera goers the world over. In 1915 he announced two new operas ready for performance, but their presentation was postponed on account of the great war.

PUCK, in English folklore, a mischievous sprite or elf, sometimes known as *Robin Goodfellow.* While he sometimes tormented people in a spirit of fun, he was seldom malicious, and did favors for those who were good to him or who gave him presents. Puck is a prominent figure in Shakespeare's *Midsummer Night's Dream.* A prominent humorous weekly publication in the United States was named for him.

PUEBLA, *pwa'blah,* one of the most attractive cities in the republic of Mexico, and

AN INDIAN PUEBLO

the capital of the state of Puebla, is situated on a plateau 7,200 feet above sea level, about sixty-three miles southeast of the City of Mexico, with which it is connected by rail. Because of the number and the grandeur of its churches, and its numerous convents, monasteries and ecclesiastical colleges, it is called the sacred city of Mexico; in magnificence its cathedral compares favorably with that of the Mexican capital. Industrially, Puebla is important as a manufacturing center, cotton, woolen goods and glass being the leading products. Puebla was made the headquarters of Carranza in November, 1914. It was soon captured by the forces of Villa and Zapata, and was recaptured by Obregon early in 1915. Population in 1910, 96,121.

PUEBLO, *pweb'lo,* the Spanish word for *village,* was applied by early Spanish explorers to those tribes of Indians in the Southwest who lived in communities of adobe or stone houses. The fact that these Indians built permanent dwellings set them apart, in the minds of the explorers, from the less advanced tribes of that region. There are hundreds of ruins of pueblos in Southwestern United States between Colorado and Utah and the Mexican border, and there are several occupied settlements in New Mexico and Arizona. The early Pueblos built their villages on the sides or the tops of steep cliffs which could be reached only by narrow pathways, thus securing their homes from hostile attacks.

Since the Southwestern tribes have come under the protection of the United States government, the Pueblos for the most part have come down to the plains, but one tribe, the Hopi, still dwells on the tops of high mesas. A typical Indian pueblo is an aggregation of many houses built one above the other, terrace style, the different stories being reached by means of ladders. The Pueblos are industrious tillers of the soil, and raise good crops of corn and vegetables. They have practiced irrigation from an early period, and weaving, basket making, wood carving and pottery making have reached a high state of development among them. They number about 10,000, representing four distinct families. The most important tribes are the Hopi and the Zuñi. See Hopi; Zuni.

PUEBLO INDIAN
A member of the tribe of the present day, living in San Juan, New Mexico. (From a photograph taken in 1916.)

Consult Peet's *Cliff Dwellers and Pueblos.*

PUEBLO, Colo., called *The Pittsburgh of the West,* ranks next to Denver in population among the cities of Colorado. It is the county seat of Pueblo County, and is situated south and east of the center of the state, 120 miles

south of Denver. The city occupies an area of over eleven square miles, in a broad basin in the eastern foothills of the Rocky Mountains. It is on the Arkansas River at the mouth of Fountain Creek, and is served by the Atchison, Topeka & Santa Fe, the Chicago, Rock Island & Pacific, the Colorado & Southern, the Colorado-Kansas, the Missouri Pacific and the Denver & Rio Grande railroads. The population, which in 1910 was 44,395, had decreased three per cent, to 42,908, in 1920. About twenty per cent of the inhabitants are foreign born.

Pueblo's parked area covers 330 acres and includes City Park (161 acres) and the Mineral Palace Park (forty-seven acres). Prominent buildings are the county courthouse, completed in 1912 at a cost of $700,000; the Federal building, a Carnegie Library, a Y. M. C. A. building and the Mineral Palace, in which is a comprehensive display of the state minerals. Among the more important institutions are the Benedictine College, Loretta Academy, Gulliford Academy, the state insane asylum, three large hospitals and several charitable organizations.

The smelting of zinc, lead, silver and gold, and the manufacture of iron and steel products (over 6,000 men being employed by one company) are the chief industries. The plants are situated near a rich mineral territory, and convenient deposits of coal and oil are used as fuel. Pueblo has also extensive stockyards, foundries and machine shops, railroad shops, lithographic works, canning factories, a packing house and manufactories of saddles, confectionery, bricks, stoves, wire fence, farm implements and other articles. There are 2,000 employed in the various industries, and the annual pay roll exceeds $2,000,000. Pueblo is an important distributing center, and handles a vast amount of freight. The agricultural and stock-raising interests of the surrounding country are considerable.

The first settlers on the site of Pueblo were a party of Mormons, who came in 1846. Four years later a trading post was established, but in 1854 the inhabitants were the victims of the Indians. Another settlement, which was organized in 1859, became a city in 1873. In 1912 the commission form of government was adopted. In 1921 the city suffered 66 deaths from flooded rivers. P.A.G.

PUERTO PRINCIPE, *pwair'toh preen'the pay,* the old name for the Cuban city of CAMAGÜEY (which see).

PUFFBALL, a species of fungus belonging to the same class as the toadstool and the mushroom. The spores of this plant develop in a globe-shaped body that bursts open when ripe, sending out, through an opening in the top, what seem to be puffs of brown smoke. This smoke consists really of clouds of tiny spores. Puffballs vary greatly in size, as some are no larger than the head of a pin, and there are giant specimens from a foot to twenty inches in diameter. Some of the larger puffballs are said to emit spores at the rate of one million a minute for several days. They spring from *mycelium,* a growth of long, slender fibers that extend for a considerable distance through the soil. When young, puffballs have a white, fleshy interior and can be eaten like mushrooms.

PUFFIN, *puf'in,* or **SEA PARROT,** an odd-looking bird found in the Arctic waters of both hemispheres, related to the auks. It has a stocky body, a large head and a bright-colored beak, a portion of which it sheds at the close of the nesting season. The breast and underparts are white, the wings, tail and forepart of the neck blackish, and the sides of the head and throat white. The puffin is an expert swimmer and diver and comes to land only in June and July, the breeding season. These birds nest in large colonies on rocky coasts, one white egg being deposited in a burrow or crevice of the rocks. Puffins are valued as food by the Northern peoples, who net them in large numbers on their annual coming to land.

PUG, a small house dog with a thick body, short, wrinkled, black nose, deeply-wrinkled face, short, smooth, fawn-colored hair, and tail curled firmly over the back. The pug is a lazy, sluggish dog, and as its chief business is that of being a pet, it usually becomes fat on account of inactivity. Though fawn-colored pugs are most commonly seen, black dogs of this breed are also found.

A PUG DOG

PUGET, SOUND, a large, irregular inlet in the northwest corner of the state of Washington. It is of great commercial importance, for on its shores are located Seattle, Tacoma, Olympia and other ports. It is one of the most picturesque bodies of water

in the United States. Its shores for the most part are high and wooded, and their water reflections add to the rare beauty of the locality.

Connecting Puget Sound with the open sea is the Strait of Juan de Fuca (which see). From the junction of this strait and the Strait of Georgia, Puget Sound extends southward for about thirty-five miles before it divides into two main branches, Admiralty Inlet on the east and Hood's Canal on the west. Port Townsend is situated at the mouth of the Sound, but most of the larger cities are on Admiralty Inlet. Olympia, which is the state capital, is at the southernmost point of the Sound. The largest ships afloat can steam into all parts of the Sound, for the water ranges in depth from 180 to 925 feet and is free from shoals.

Puget Sound makes seaports of cities which are fifty to seventy-five miles from the Pacific Ocean, and it carries a vast amount of commerce. It is also noted for the fisheries along its shores. Salmon packing and canning are among the most important industries of the region, and large quantities of halibut and cod from the Alaska fisheries are brought to Puget Sound ports for canning. The shores were once densely forested, and many sections are still covered with fine timber, but the lumberman has made heavy demands on this great, natural resource.

PUGSLEY, *pugs'li,* WILLIAM (1850-), a Canadian statesman, for many years a leader of the Liberals in New Brunswick, and from 1907 to 1911 Minister of Public Works in the Laurier Ministry. After 1911 he continued to serve in the House of Commons as a private member. Pugsley was born at Sussex, N. B. After his graduation from the University of New Brunswick he studied law, and in 1872 was called to the bar. For ten years he was reporter to the supreme court of New Brunswick. From 1885 to 1907 he was a member of the provincial assembly, and during this period was at intervals speaker, solicitor-general, attorney-general and, finally, premier. In 1907 he entered the Laurier Ministry, and was elected to the House of Commons.

PUISNE, *pu'nee,* a legal term used in Great Britain and various British dependencies to designate associate judges or justices. The term is derived from the old French, and means *junior.* Its present use, somewhat like that of a "junior lord," is to distinguish an associate judge from the chief justice. In Great Britain the designation *puisne* is restricted to certain courts, but in Canada it is in general use for all courts.

PULASKI, *pu las' ki,* CASIMIR (1748-1779), a Polish soldier who rendered valiant service to the Americans in the Revolutionary War, was born in Podolia. After serving in the Polish army with the Duke of Courland, he joined his father and brothers in the heroic movement to liberate his country from Russian power. Accused of attempting to capture King Stanislas at Warsaw, he was exiled. Upon going to France, escaping by way of Turkey, he met Benjamin Franklin and was prevailed on to aid the Americans in the War of Independence.

COUNT PULASKI

Pulaski joined the American army in Philadelphia as a volunteer in 1777, and after distinguishing himself in the Battle of the Brandywine was promoted to the rank of brigadier-general. Then he joined the main army at Valley Forge, was commissioned to organize an independent corps of cavalry, which was named Pulaski's Legion, and was sent to South Carolina. He was wounded in the siege of Savannah, where he commanded the French and American cavalry, and died shortly after being taken on board the *Wasp,* lying in the Savannah harbor.

PULITZER, *pu'lit zer,* JOSEPH (1847-1911), one of the greatest American journalists, born at Budapest, Hungary. His father was a Jew and his mother a Roman Catholic. He received but little schooling, and at the age of seventeen emigrated to America, where he immediately entered the Union army, in the War of Secession. After peace was declared he worked as a fireman on a Mississippi steamboat for nearly two years. Toward the close of 1868 the young man secured a position as reporter for a German newspaper in Saint Louis and was so successful that within four years he was managing editor and part owner. He took an active interest in politics and became such a powerful leader among German voters that he was influential in nominating Horace Greeley for the Presidency in 1872. Three years later, however, Pulitzer became a Democrat and sold his share in the Saint Louis pa-

per, which was a Republican organ. In 1877 he acted as special correspondent in Europe for the New York *Sun* and displayed a remarkable mastery of a language which twelve years earlier he could not speak.

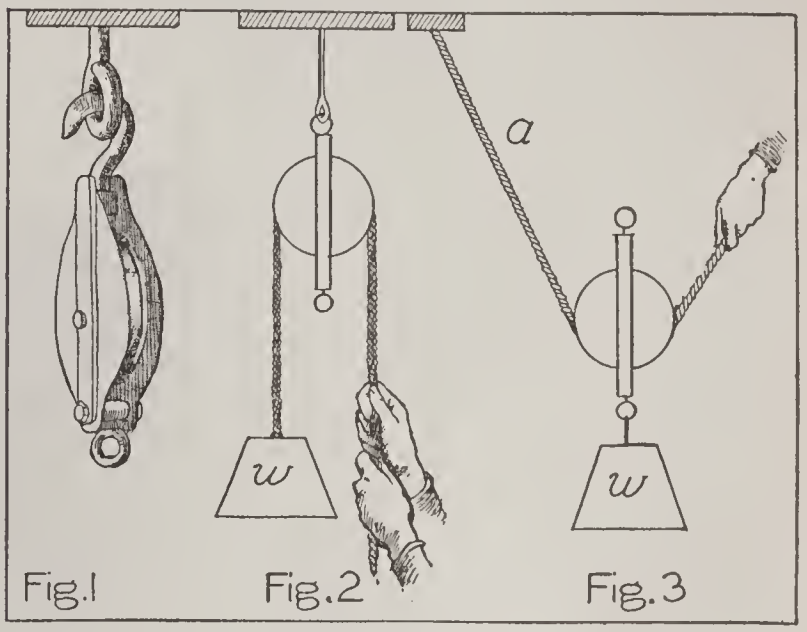
In 1879 he bought the Saint Louis *Dispatch* and *Evening Post,* united them under the title of *Post-Dispatch,* and within four years made a fortune from the venture. When Pulitzer bought the New York *World* from Jay Gould in 1883, it was considered an ill-advised purchase, but his genius at once forced the paper into a leading position. He was elected to Congress from New York in 1885, but disliked the work and resigned his position within three months.

In 1887 his eyesight began to fail, and within two years he was totally blind. In this condition he continued his editorial and other activities until within a few hours of his death on October 29, 1911. Pulitzer in his years of affliction sailed all over the world attended by a number of secretaries, and kept in daily touch with his business in New York City. His life is an admirable example of the height to which a poor and ignorant emigrant may rise. At the time of his death he was not only one of the richest but one of the most cultured publishers in the world, interested in literature, music, art and many other fields. Among his principal bequests were $1,000,000 to the Columbia School of Journalism, which he had founded in 1903 with a gift of the same amount, and $500,000 to the New York Philharmonic Society.

PULLEY, *pul'i,* a small wheel turning on an axle and with its circumference grooved to hold a rope. It is a form of simple machine, because it is a mechanical contrivance which will do work. There are two forms, the fixed pulley and the movable pulley.

Fixed Pulley. As every one knows, it is easier for a person to pull downward than upward, because in the former case his weight is added to the strength of the muscles. So if one wishes to lift a heavy weight it is sometimes convenient to attach a rope to it, throw the rope over a beam and pull downward. But the friction of the rope against the beam takes away very much if not all of the advantage thus gained. If the beam would turn as the rope passes over it practically all friction would be avoided. This is exactly the principle of the fixed pulley—one whose axle is fastened to an immovable object. It merely changes the direction of a pull.

Movable Pulley. If the pulley is fastened to the object to be moved, a *mechanical advantage* may be gained; that is, the force needed to raise the object is less than its weight. In Fig. 3 the weight of the object *w* is supported half by the end of the rope *a* and half by the end of the rope which is held in the hand. Therefore any pull by the hand in excess of half the weights of the object and the pulley, will lift the weight. The mechanical advantage in this case is said to be *two,* because the weight is twice the effort needed to hold it. The article Block and Tackle describes movable pulleys which have a much larger mechanical advantage. See Mechanical Powers.



THE PULLEY

Fig. 1, a simple pulley; Fig. 2, a fixed pulley, which merely changes the direction of the power; Fig. 3, a movable pulley, which increases the effectiveness of the power.

PULL'MAN, George Mortimer (1831-1897), an American inventor, born in Chautauqua County, N. Y. He learned the cabinetmaker's trade, but in 1853 gave up this work to undertake a large contract for removing buildings that interfered with the widening of the Erie Canal. In 1859 he went to Chicago and there built from two ordinary railway coaches the first models of a sleeping car. He borrowed the idea from a Mr. Woodruff of Pittsburgh, who had invented a form of sleeping car about two years previous. The scheme did not meet with public favor at first, and it was not until 1863 that his invention was accepted by the railroads. Four years later he organized and became president of the Pullman Palace Car Company, and in this enterprise made a large fortune. As a man of practical philanthropic turn, he planned and built in 1880 the model town of Pullman, Ill., with handsome houses, wide streets and modern conveniences. The courts later declared it unlawful for the busi-

ness corporation to own the town it had built, and Pullman was given a village charter. In 1889 it was annexed to Chicago.

PUL'MOTOR, a device for inducing artificial respiration, used in cases of electric shock, gas poisoning and drowning. It consists primarily of a tank of compressed oxygen connected with an injector, by means of which oxygen diluted with air is conveyed to the lungs of the patient. In the original type of instrument an ingenious mechanical device operates a valve in such a way that air is blown to or sucked from a mask fastened over the patient's face. An improved model has a switch worked by hand instead of the automatic device. It is claimed that the latter instrument provides a more natural method of respiration.

When the pulmotor was first introduced many extravagant claims were made for it, but experience has shown that its value has been overrated. After an exhaustive investigation, a committee acting under the direction of the United States Bureau of Mines reported that in a large number of supposed resuscitations the patient had begun to breathe before the apparatus was used. The committee pointed out the dangers connected with the use of such devices, one of which is their tendency to suck air out of the small air cells of the lungs, causing them to collapse. Another source of peril is their tendency to pump air into the stomach. In the hands of a person who does not understand it, the pulmotor may be a very dangerous instrument. It should be remembered that if artificial respiration is not begun within ten minutes after the subject has stopped breathing, nothing can be done to revive him. For this reason some manual method of resuscitation should always be attempted, for it is fatal to wait any length of time for a device to be brought. A standard manual method of inducing respiration is described in these volumes in the article Drowning. A halftone illustration of the pulmotor accompanies this article.

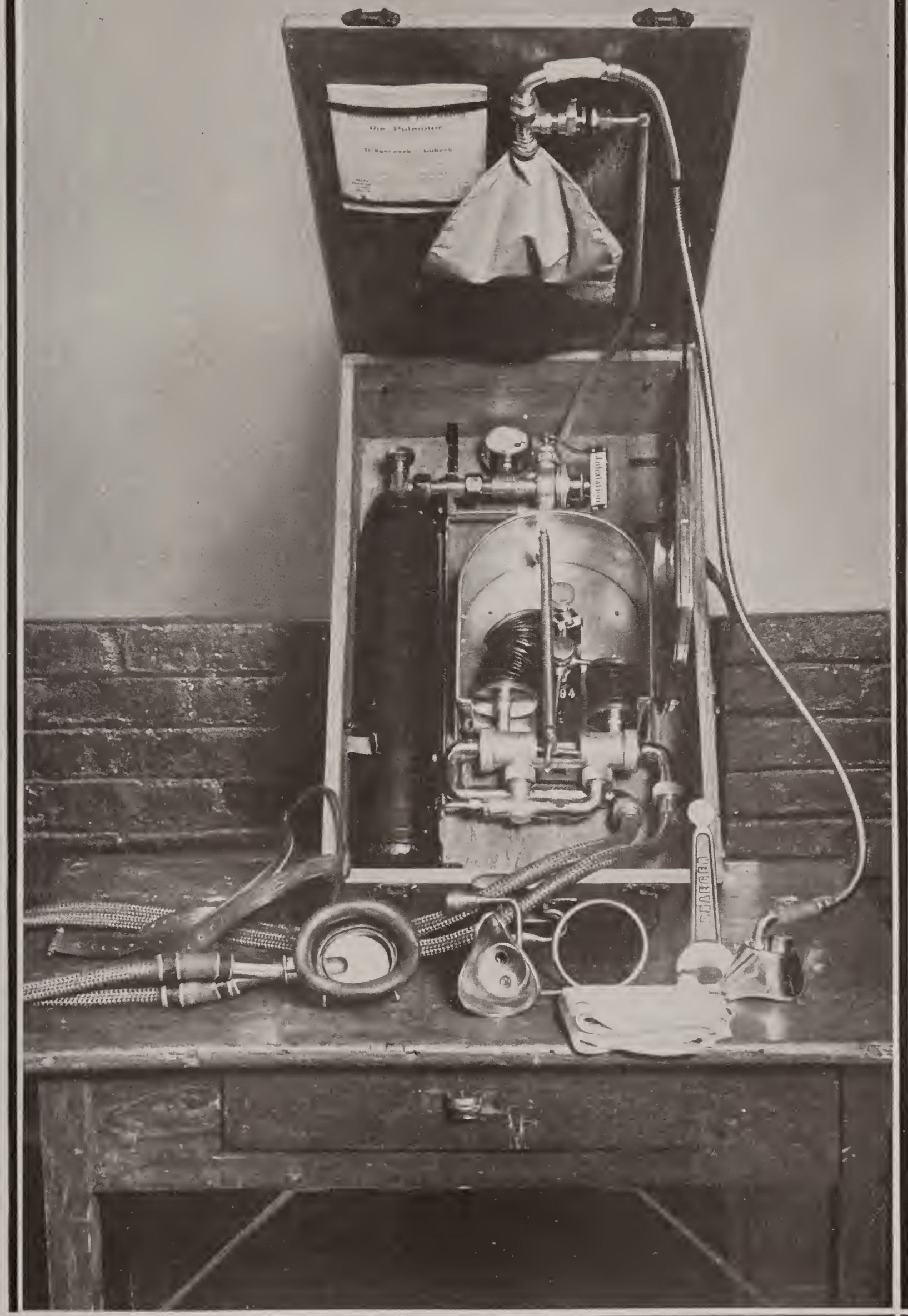
PULQUE, *pool'ka,* an alcoholic drink, generally considered the national beverage of Mexico. It is made by fermenting the juice of the agave for about ten days and then mixing with it a small quantity of fresh juice. This causes a rapid, violent fermentation, and the pulque is ready for use in about forty-eight hours. The drink has a heavy taste somewhat resembling sour milk, and, while not pleasant to foreigners, is greatly relished by the natives of Mexico. It is very cooling and rather nutritious, but if taken in large quantities causes excessive intoxication. So much of it is consumed that not less than ten million dollars is invested in Mexico in agave cultivation. See Yeast; Bacteria and Bacteriology.

PULSE, The, a regular throbbing in the arteries, felt as a distinct beat in the radial artery at the wrist, or in the temporal artery. In the system of blood circulation, with each contraction of the left ventricle a wave of blood is poured into the aorta, the great artery which carries blood from the heart. The aorta is already filled with blood, and the wave forced into it by each contraction of the ventricle causes its walls to expand. Being elastic, they then contract, and force the blood into the arteries branching from the aorta, where the same process is repeated. Thus a series of expansions and contractions travels along the entire arterial system. The pulse is felt easily at the wrist and temples because the arteries there are near the surface. Doctors feel the pulse of a sick person, for they know that if it beats too fast or too slow there is some irregularity of the heart's action. The pulse of a healthy adult beats on an average seventy-two times a minute. It is more rapid in children than in adults and slower in old age than in middle life. There is no discernible pulse in the veins. See Circulation of the Blood; Heart.

PULSE FAMILY. See Leguminous Plants.

PUMA, *pu'mah,* or **COUGAR,** *koo'gahr,* a wild animal of the cat family, once found in the Americas from Canada to the southern part of South America. With advancing civilization it has become extinct in large areas of its range, but is still abundant in the Rocky Mountain district, where it preys on sheep, calves and other ranch animals. In that part of the country the puma is called *mountain lion,* because of its resemblance to a lioness. It is also known as *panther* and *cougar.* The coat of the adult puma is tawny, the hairs being fawn-gray tipped with red. It has no spots, in this respect differing from the jaguar (which see); the throat, insides of the legs and the belly are white, and the tip of the tail black.

The young are born with dusky-brown spots and with ring marks on the tail, but these markings disappear in about six months. A full-grown animal is four or five feet long, exclusive of the tail, which measures about two feet in length. The body is slender, the legs long and the head round and rather small.

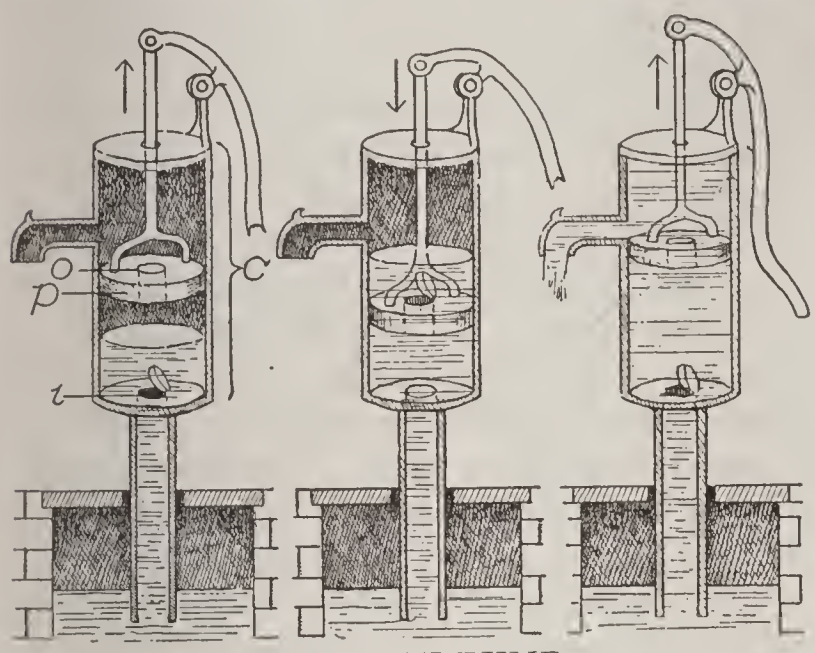


THE PULMOTOR. The long, black tube contains pure oxygen. This is mixed with ten to thirty per cent of air when administered to the patient.

Though many stories are told of the treachery of the puma, and of its habit of springing on passers-by from trees, in reality it seems to be less ferocious than other wild cats and to be reluctant to attack man. Ranchers regard it as a pest because in attacking a sheepfold it is not content with killing one sheep, but must make way with a hundred or more.

PUMICE, *pum'is,* a spongy rock, so light that it floats on water, used for polishing wood, metals, ivory and other articles. It may be gray, white or some shade of brown. It is a sort of lava (which see) and contains more or less glass in fine particles, which fact gives the stone its value for polishing surfaces.

PUMP, one of the common devices by which man utilizes simple laws of physics and compels the forces of nature to do part of his work for him. Not all pumps operate according to the same principle. The suction, or lift, pump, the centrifugal pump and the turbine pump all depend upon different laws; the force pump is a suction pump with an additional feature.



THE LIFT PUMP

In the figure *c* is the cylinder; *p,* the piston; *i,* the intake valve; *o,* the outlet valve.

In the first position the piston is being raised. The outlet valve is air-tight, and all the air is being forced out through the spout.

The pressure of the water raises the intake valve, and water takes the place of the air removed.

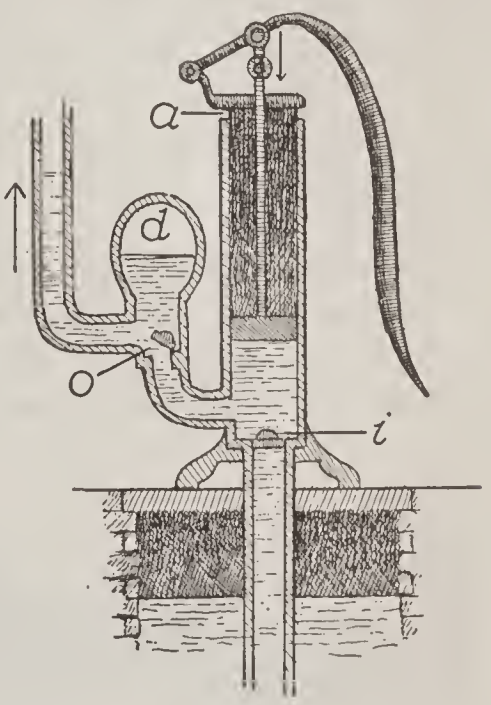
In the second position the piston is being lowered through the water which has entered. The pressure now opens the outlet valve and closes the intake valve, preventing the return of the water to the cistern below.

In the last position the water is being forced out as the air was in the first instance, and more water is entering.

The Lift Pump. This is the common kitchen or well pump, so indispensable in rural communities. Before Galileo's time scholars thought that the suction of such a pump was due to nature's refusal to permit a vacuum, but Galileo, late in the sixteenth century, noticed that the pump would not raise water much more than thirty feet, and correctly attributed its workings to the fact that air has weight. If in the pump shown in the illustration the cylinder and the pipe leading to it from below were emptied of air, there would be no pressure on the water under the mouth of the pipe. But air would still be weighing on the water around it, and since pressure on a liquid is transmitted through it in all directions, water would be pressed upward into the pipe. How the pump is constructed so as to take advantage of this law is shown in the illustration. The labor which the pumper performs merely lifts the water to the spout after nature has raised it to the intake valve.

Sometimes a pump refuses to work until it has been *primed,* by having water poured into it. This is because its valves are not air-tight unless they are wet.

The Force Pump. The intake valve of a suction pump can never be more than thirty-three feet above the water in the cistern (see BAROMETER), and because of the imperfect valves of most pumps this limit is reduced in practice to about twenty-seven feet. But above the intake valve the water is raised by the force exerted on the piston, so if the spout is turned upward the only limit to the height lies in this force.



THE FORCE PUMP

In the figure *d* is the air dome; *o,* the outlet valve; *i,* the intake valve; *a,* the air valve.

The pump empties the cylinder of air in the same fashion as the lift pump, but on the return stroke the water, instead of being admitted through a valve in the piston, is forced through an opening at the side and past the outlet valve.

The air dome serves to maintain the flow between the pressure strokes. When the water is being forced through the outlet valve it compresses the air in the dome; as soon as the piston starts to withdraw the outlet valve closes and the compressed air expands, driving more water into the outlet pipe.

The principle of the force pump is therefore the same as that of the lift pump, but another law of physics is commonly utilized to gain smoothness in operation. This is the law that compressed air always seeks to expand. How this helps to give a constant flow is shown in the second illustration.

Centrifugal and Turbine Pumps. When you swing a bucket of water around your head, the water does not spill out, for it is pressed toward the bottom of the pail by centrifugal force, the same force which makes mud fly from a wagon wheel. If a number of bottomless pails were whirled around inside a pipe, and there were only one hole where water could leave the pipe, each pail as it passed this hole would throw some of its water out and suck up more at the center. This is exactly the action of a centrifugal pump, though instead of pails there are ordinarily four blades. This type of pump has the merit of giving constant flow, but it will not lift water very high.

The turbine pump is like a many-bladed screw propeller or an electric fan. Like the centrifugal pump it produces a constant flow. In addition it is free from valves, which in some classes of work would be liable to become clogged with sand or other small particles.

Consult Bjorling's *Practical Handbook of Pump Construction.*

PUMP'KIN, a coarse, running vine with hollow stalks, broad, prickly leaves and large, orange-colored, gourdlike fruit. The plant is believed to have been known to the native Americans and planted among their corn; in

THE PUMPKIN
Fruit, flower and vine.

England it has been cultivated since the year 1570. The globe-shaped fruit, often two feet in diameter, has tough, stringy pulp and large, white seeds. It is not fit to eat raw, but when cooked with other ingredients makes delicious filling for pies.

Whittier, in his poem *The Pumpkin,* refers to the custom of making jack-o'-lanterns from the fruits on Hallowe'en (see HALLOWE'EN), as well as to the heroine of the fairy story *Cinderella,* who went to a ball in a coach made from a pumpkin.

O,—fruit loved of boyhood!—the old days recalling,
When wood-grapes were purpling and brown nuts were falling!
When we laughed round the corn-heap, with hearts all in tune,
Our chair a broad pumpkin—our lantern the moon,
Telling tales of the fairy who travelled like steam
In a pumpkin-shell coach, with two rats for her team.

PUNCTUATION, *pungk tu a' shun,* in writing and printing, is the use of certain signs to mark off from each other sentences or parts of sentences. The early Greek manuscripts had no punctuation and no break between words, and the reading of solid blocks of letters must have been in some cases a matter of considerable difficulty. The first attempt at punctuation of any kind is to be found in Alexandrian manuscripts of the fourth century B. C., and takes the form of a mark to indicate paragraph divisions. Gradually a sort of scheme was worked out, a circle standing for a full stop, a dot high above the line for a lesser break in thought, such as is in part indicated by the modern semicolon or colon, and a dot midway above the line for a slight break. This was in a measure adopted by Latin writers of manuscripts, but it cannot be said that the scheme was ever systematized or very widely used.

Constant attempts were made, however, to adopt an effective system of marking, and about the ninth century the comma appeared in use among the monks of Europe, followed a little later by a mark like the semicolon, which was, however, a question mark. The systematizing of a real punctuation scheme was the work of Aldus Manutius, a Venetian printer who lived in the fifteenth and sixteenth centuries. Many variations have been made since, but the system of punctuation as it exists in all modern languages remains unchanged in its essential details.

In English, much latitude is allowed in punctuation. Certain rules, of course, are never broken, but beyond that personal choice largely governs the use of the marks. The best method of learning to punctuate properly is not merely to memorize and apply rules, but to watch the closeness of connection in the thought. There is a cause for every mark of punctuation, and, this once learned, proper use of marks becomes a comparatively simple matter. *Open punctuation* is the use of only those marks which the sense absolutely demands; *close punctuation* is the more liberal use of the signs. The present-day tendency is toward the former rather than the latter style, sometimes at the expense of clearness; but authorities differ so widely that it is impossible to establish unvarying rules. The common marks of punctuation, with their chief uses, are given below:

Period. The period (.) is used at the close of every complete sentence which is neither an exclamation nor a question, and after all abbreviations. It was formerly the custom to use a period after every Roman numeral, but the tendency now is to omit the point. By common acceptance the period after the numeral adds *th;* thus, *George V. reigns* is read *George Fifth reigns.*

Interrogation Point. The interrogation point (?) is used to mark a query, and should be placed after every sentence which is a direct question, as "Where are you going?" Indirect questions, however, are not followed by an interrogation point: "He asked where I was going." In Spanish the interrogation point is used at the beginning as well as at the end of a question.

Exclamation Point. The exclamation point (!) is used to mark an emphatic utterance or an outcry, whether this is a full sentence or merely a few words: "Hello!" "Curfew must not ring tonight!" "Long live the king!" The use of this mark as a sign of irony, as in "He presented us to his three beautiful (!) daughters," is not considered in good taste.

Comma. The comma (,) is the most used of all the points, because it marks the slightest interruption in the thought or in the grammatical structure of a sentence. There are more variations in its uses than in those of any other points, but the rules which follow are accepted by practically all the best authorities:

(1) A comma is used to separate the members of a series: "Roses, lilies, pansies and marigolds grew in the garden." Some writers place a comma after the next to the last member, before the *and,* but usage on this point is by no means uniform. It is used between the other words of a series as indicating the omission of *and.*

(2) To divide proper names which belong to different places or individuals: "To Europe, America used to appear a benighted continent"; "For Mary, Jane had not a word of reproach."

(3) Ordinarily, to set off clauses introduced by the conjunctions *and, but, if, while, as, when, because,* and so on. This rule applies particularly to cases where the subjects change. "We did the work, but you have reaped the benefits"; "John sprang to his feet, and Mary cried out in amazement"; "As I cannot see him, I shall not wait"; "When you meet him, give him my regards." In cases where such a clause is necessary to the meaning of another clause, the two are not separated by commas: "I would not if I could."

(4) To set off such conjunctions, adverbs, or phrases as *now, however, nevertheless, for instance, after all, of course,* and the like, when they occur at the beginning of a sentence or clause or are so placed in the middle of a sentence or clause as to make a distinct break in the structure: "Now, the gist of the matter is this"; "However, you persisted in your folly"; "Nevertheless, you will have to concede the point."

(5) After participial phrases at the beginning of a sentence, especially if these contain an explanation of the main clause: "Hearing a noise, he went to the door"; "Having found out the truth, we trusted him no further."

(6) To set off phrases or clauses so placed as to cause a break in the structure of the sentence: "Since, by the doctor's advice, you are here, why not make the best of it?" "If, as I believe, this is true, let us act upon it."

7. To separate two identical or very similar words, even if grammatically no such separation is necessary: "Whatever is, is right"; or to separate two numbers: "In 1911, 246 delegates were present."

(8) To indicate the omission of some word or words which must be mentally supplied if the meaning is to be clear: "Harry has six books; John, five; Mary, four." This rule is not invariable.

Commas are by many writers given additional uses, but the above are the ones in which they are required to assure clearness.

Semicolon. The semicolon (;) is used to mark a break in thought or structure greater than that shown by the comma. Sometimes two clauses which really seem like distinct sentences are separated by a semicolon because the writer wishes to place emphasis upon the close connection of the thought. When a number of clauses which might otherwise be separated by commas contain commas, the semicolon is used for clearness: "In October, if all goes well, we are planning a harvest festival; in November, a Thanksgiving celebration; and in December, a Christmas pageant."

Colon. The most common use of the colon (:) is to indicate that what follows it explains what precedes it. In practice, it is seldom used except in this introductory manner, to call attention to some quotation, illustration or example, as seen in the above paragraphs.

Dash. The dash (—) is used to indicate a sudden break in sense, structure, or both: "To be or not to be—that is the question"; "Shall I—dare I—do it?" Often the phrase or clause which follows the dash is explanatory of that which precedes, as in the following quotation:

> Because the good old rule
> Sufficeth them—the simple plan,
> That they should take who have the power,
> And they should keep who can.

The dash should not take the place of other marks of punctuation—commons, semicolons and even periods—as it is frequently made to

do by careless writers, for a slovenly style results.

Quotation Marks. (1) Quotation marks (" "), as the name indicates, set off citations of a passage in the words of the author. In printed works, if such a passage is in smaller type, no quotation marks are necessary if author's name is given, nor are these signs used in indirect quotations, as: He said he would be glad to go.

(2) A technical, unusual or ironic word or phrase in the midst of reading matter is often set off with quotation marks: You will have to make an "insert" of that. The so-called "head of the house" is not allowed to call his soul his own.

(3) A quotation within a quotation calls for single quotation marks: "He cried, 'I am ready.'" If a long quotation embraces several successive paragraphs, the quotation marks appear only at the beginning of each paragraph and at the end of the concluding paragraph.

Parentheses. Parentheses ( ) are used to enclose words, phrases or clauses thrown into the midst of a sentence to explain or to introduce some thought or suggestion that is really not essential to the course of the argument: "You say (I believe I caught your meaning correctly) that you will have no part in the movement." Such distinct breaks, if they occur in any number, are a sign of a careless style; lesser breaks can be as well set off by dashes or even by commas. A.MC C.

Consult Perry's *Punctuation Primer.*

PUNIC, *pu'nik,* **WARS,** the name given in ancient history to three struggles between Rome and Carthage. The name Punic was given by the Romans to the Carthaginians because of their Phoenician origin. The first of these wars lasted from 264 to 241 B.C., the second from 218 to 201 B.C., and the third from 149 to 146 B.C. The Romans were victorious in all three, in the first gaining possession of a part of Sicily which had previously belonged to Carthage, in the second winning Spain, and in the third utterly overthrowing the Carthaginians and destroying their city. By this last achievement Rome became supreme mistress of the world.

Related Subjects. The reader is referred to the following articles in these volumes:

Carthage	Regulus, Marcus
Hamilcar Barca	Rome
Hannibal	Scipio

PUNJAB, *pun'jahb,* a province in the northwestern part of British India, consisting chiefly of a vast plain sloping gradually southward from the foothills of the Himalaya Mountains. The name is the Hindu word for *five rivers,* and has reference to five streams which drain the region and pour their united waters into the Indus River by way of the Punjnad. The province has a total area of 136,330 square miles, 99,779 square miles of which are under a British governor; the remaining territory is divided into a number of native states, but all of these are subject to British authority. In 1911 the native states had a population of 4,212,794; the British province, a population of 19,974,956 (10,000,000 Mohammedans, 6,500,000 Hindus, 2.000.000 Sikhs). Lahore, with a population of 228,687, is the capital of the province; the next largest cities are Amritsar (152,576) and Multan (99,243).

LOCATION MAP

Agriculture is the most important industry in the Punjab, this province having a larger area under irrigation (about 11,600,000 acres) than any other of the British divisions. This region is the most important wheat-growing section in India. Other crops of commercial value are millet, maize, barley, oil seeds, sugar cane and cotton. Over three-fifths of all the camels in British India are found in the Punjab, which contains large desert areas, particularly in the southern part. See INDIA.

PUNTA ARENAS, *poon'tah ah ra'nahs,* the most southern city in the world, almost pathetic in its loneliness and its distance from other cities. It is situated on the Strait of Magellan, at the south end of the continent of South America, being the capital of the Chilean territory of Magallanes. It is in latitude 53° 10′ south and is 1,414 miles from Valparaiso, Chile, 3,928 miles from Panama, 4,036 miles from Cape Town, South Africa, and 6,184 miles from San Francisco. It is 2,233 miles from Punta Arenas to Rio de Janeiro, and, by way of the latter port, 7,430 miles to London, 7,400 miles to New Orleans and 6,980 miles to New York.

Punta Arenas has been important chiefly as a coaling station for steamships, though its seal fisheries have considerable value. The city was

founded in 1849, on the site of a former penal colony. With muddy streets, ox teams and log or frame houses, it resembles a frontier town of North America in the middle of the nineteenth century. It has many foreigners en-

LOCATION MAP

gaged in sheep raising, farming and lumbering. The city is ambitious, and has banks, stores and a good theater. In 1915 it had 10,500 inhabitants, more than 1,000 less than it had in 1907.

PUNXSUTAWNEY, *pungk soo taw' ni,* PA., the business center of a noted bituminous coal region, is situated in Jefferson County, about midway between the geographical center and the western border of the state, and on Mahoning Creek. Altoona is forty-five miles southeast and Pittsburgh is 106 miles southwest. Transportation is provided by the Pennsylvania and the Buffalo, Rochester & Pittsburgh railroads, and electric lines communicate with cities and towns northeast. Punxsutawney is the headquarters of some of the largest bituminous coal and coke interests in the United States. There are also iron works, foundries, machine shops, glass works and silk mills. Punxsutawney was organized as a borough in 1849. Since 1907, when it was consolidated and incorporated with the borough of Clayville, it has been known locally as *Greater Punxsutawney.* The name, which signifies *Mosquito Town,* was taken from the Indian word *ponki,* meaning *blood-sucking insect.* In 1910 the population of Greater Punxsutawney was 9,058; in 1920 it was 10,311 (14 per cent gain). The borough is three and one-half square miles in area.

PU'PA, the name applied to an insect when it is in the resting stage of its development, just before it becomes a fully-developed specimen. In the case of the butterfly, for instance, during the pupal stage the animal is enclosed in a cocoon. See COCOON; INSECT, subhead *The Developing Insect;* METAMORPHOSIS, subhead *The Pupa.*

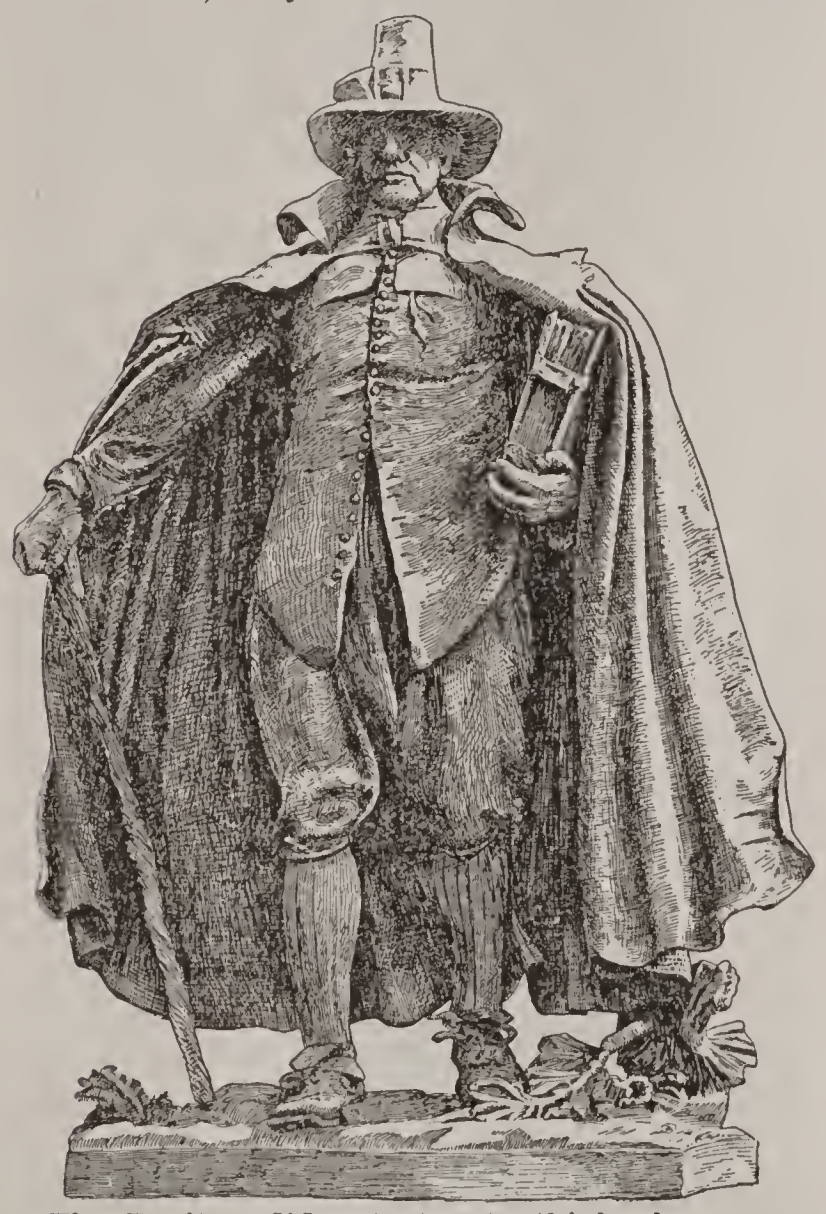
PURDUE' UNIVERSITY, established in 1869 at Lafayette, Ind., is one of two universities supported by the state of Indiana. The other is Indiana University (which see), at Bloomington. Purdue University is primarily an institute of technology, and is organized into schools of mechanical, civil, electrical and chemical engineering, agriculture, science and pharmacy. It admits women to all courses. Founded under the Federal land grant act of 1862, the institution was named for John Purdue, who gave 100 acres of land and $150,000 as an endowment. Regular sessions were begun in 1874. The university campus and farm cover 279 acres, and the total value of all property approaches $2,000,000. The faculty numbers about 245 and the student body, over 3,200. The university library contains 50,000 volumes.

PURE-FOOD LAWS. See ADULTERATION OF FOODSTUFFS AND CLOTHING.

PURGATORY, *pur' ga to ri,* according to the belief of the Roman Catholic Church, is a state in which the souls of persons dying repentant suffer the expiation of their sins before being allowed admission into heaven. It is believed that these sufferings are lessened by the offering of prayers and masses. The doctrine of purgatory was first suggested by the Church fathers in the third century, and was established by Gregory the Great in 604 as a regular dogma of the Church.

PURITANS, *pu' ri tanz.* This is one of those names which, given in derision, have come to be badges of honor to those who have borne them. If the name and the work of the Puritans were omitted from English and American history, the tale would lack much of its vital, soul-stirring quality; if the traits of the Puritans were eliminated from English and American character, that character would lack many of its most admirable traits. Later centuries have given the credit for love of freedom and of Protestantism—even democracy itself—to those serious, earnest men who in their own day were looked upon as fanatics whose sole aim was to make the world not better, but more unhappy.

The Church of England had broken with the Church of Rome, but all parties within the Church were not satisfied, and a certain body of reformers, by their insistence on "purifying" the ritual and doctrines of the Church and on accepting as authority only the "pure word of God," won for themselves the derisive title of *Puritans*. They did not wish, as did the Separatists, to leave the Church of England, but as they lost, little by little, all hope of the longed-for reforms, they broke more and more with



The Puritan did not stop to think; he recognized God in his soul, and aeted.
—Wendell Phillips.

The illustration is that of the famous statue, *The Puritan,* representing Deaeon Chapin, founder of Springfield, Mass. It is the work of Saint Gaudens.

the parent body. In time small groups, dissatisfied with civil and religious conditions in England, and encouraged by the example of the Pilgrims who had founded Plymouth Colony, emigrated to America and began to make settlements on the shores of Massachusetts Bay. The settlements at Boston, Charlestown, Dorchester, Roxbury and Watertown were all Puritan enterprises. It is a disappointment to the student of colonial history to learn that these lovers of religious freedom were not willing to allow that same blessing to every one, but treated with harshness those who dared to differ from their principles.

In England the Puritans played for a time an important part in politics. The bitter struggle between Charles I and his Parliament over the question of the divine right of kings; the death of Charles I; the establishment of the Commonwealth under the leadership of Cromwell; the raising of England to a position of power and respect among the nations—all of this the Puritans brought to pass. Their political power was lost with the restoration of the Stuart dynasty in 1660, but the spirit of Puritanism at its best was a permanent force for good in England. Macaulay, none too friendly a critic, who declared that the "Puritan hated bear-baiting, not because it gave pain to the bear, but because it gave pleasure to the spectators," thus sums up their place in history:

> We would speak first of the Puritans, the most remarkable body of men, perhaps, whieh the world has ever produeed. The odious and ridieulous parts of their eharaeter lie on the surfaee . . . . the ostentatious simplieity of their dress, their sour aspeet, their nasal twang, their stiff posture, their long graces. . . . . The Puritans were men whose minds had derived a peculiar character from the daily eontemplation of superior beings and eternal interests. . . . . The Puritan . . . . . prostrated himself in the dust before his Maker; but he set his foot on the neek of his king.

Consult Brown's *The English Puritans;* Byington's *The Puritan as Colonist and Reformer.*

Related Subjects. The following artieles in these volumes may be read in this connection:

Barebones Parliament	Massachusetts, subhead *History*
Commonwealth of England	Massaehusetts Bay Colony
Cromwell, Oliver	Naseby, Battle of
Endicott, John	Pilgrims
Grand Remonstranee	Plymouth Colony
Hampton Court Conferenee	Roundheads
Long Parliament	Self-Denying Ordinance
Marston Moor	Winthrop, John

PURPLE, *pur'p'l,* a color produced by mixing red and blue pigments. Different shades are produced by varying the proportions of red and blue. Tyrian purple, which is a deep crimson, was the only purple known to the ancients. The dye was obtained from a shellfish found in the Mediterranean Sea, and called by the Romans *purpura murex,* hence the name *purple.* Since each shellfish yielded only a small quantity of the dye, the color was very expensive. In the time of Cicero (which see) a pound of wool dyed with Tyrian purple cost $175. Because of this cost purple was the symbol of rulers and of wealth. Jesus describes a "certain rich man which was clothed in purple and fine linen." The Roman Emperor wore a

purple toga, the royal decrees of the Byzantine empire are said to have been written with purple ink, and we still use the expression "the purple" to convey the idea of rank or authority.

The Romans discovered a process for making a purple dye from a variety of lichen and kept the process secret for more than a century. Now purple dyes are made from coal-tar products. See COLOR.

PURSLANE, *purs'layn,* commonly known as *pursley,* or *pulsey,* a trailing weed which grows in warm regions in various parts of the world. It is a short-lived annual plant and bears inconspicuous yellow flowers that open only in the early part of the day. The young shoots of the plant are sometimes eaten in salads or pickled. Purslane is classed as a herb and belongs to the portulaca family.

PURSLANE

(*a*) Stalk and leaves; (*b*) seed, highly magnified; (*c*) the weed as it appears, growing close to the ground.

PUT'NAM, ISRAEL (1718-1790), an American patriot who saw active service in the colonial and Revolutionary wars. He was born in Old Salem, Mass. (the present Danvers), and settled in Connecticut as a farmer and woolgrower. During the last French and Indian War (1754-1763), in which he rose to the rank of major, he was captured by a band of French and Indians and exchanged only after suffering cruel torture. Toward the close of the struggle he led a Connecticut regiment in an expedition to the West Indies. Throughout the prerevolutionary period Putnam showed himself a most zealous opponent of British tyranny, serving as chairman of one of the committees of correspondence (which see).

He heard the news of the Battle of Lexington while he was working in the field, and, leaving his plow, he started at once for Cambridge and allied himself with the cause of the colonies. For six years he gave his best services to the cause of American liberty, retiring only when an attack of paralysis made him an invalid. In the Battle of Bunker Hill he displayed conspicuous courage. Commissioned a major-general by Congress, Putnam gave Washington valuable aid in the operations about New York and in New Jersey, and his last command was in the Highlands. At Hartford, Conn., there is a fine monument in his honor, the work of J. Q. A. Ward.

PUTREFACTION, *pu tre fak'shun,* the decomposition into simple elements which takes place in dead tissue of plants and animals under the influence of bacteria, everywhere present in the lower air, in water and on the earth (see BACTERIA AND BACTERIOLOGY). Putrefaction is another term for decay. When the decomposing substances are proteids, ptomaines and ill-smelling gases are generally produced; thus, sulphureted hydrogen is the characteristic poisonous and bad-smelling gas of rotten eggs. Putrefaction is aided by warmth, moisture and exposure to air, but very high and very low temperatures interfere with its progress. According to this principle, meats are kept fresh in cold storage, and milk is heated to boiling and protected from the air to prevent its becoming sour. Certain antiseptics arrest the progress of putrefaction.

Related Subjects. Various phases of this subject are treated in these volumes in the following articles:

Antiseptic	Food Products, Preservation of
Cold Storage	Pasteur, Louis
Fermentation	Ptomaines

PUTTY, *put'i,* a cement made of whiting (fine chalk) and boiled linseed oil, used to fill cavities in wood finishing and to fasten window panes in sashes. For inside work, white lead is often added, together with a little tallow to keep the mixture from getting too hard. A formula for a cheap and good putty is as follows: Mix equal parts of finely ground whiting and white lead with enough linseed oil to make a thick liquid, then add whiting or commercial putty until the mixture has the desired thickness.

PYGMALION, *pig ma'le on,* a mythical Grecian sculptor who became so disgusted with the wickedness of the women of his native town that he scorned them all and refused to marry. All the love which he should have given to a woman went to his art, and as a punishment Venus decreed that he should fall in love with

a statue of Galatea which he had carved. So great did this love become that Venus in response to his prayers endowed the statue with life, and the nymph then became Pygmalion's wife.

PYGMIES, *pig'miz,* a name applied to those peoples who are far below normal in stature and who exhibit this peculiarity as a racial characteristic, not as an acquired defect. The men of such races are, on an average, less than five feet tall. In general, pygmies may be divided into two groups—the African, or Negrillos, and the Asiatic, or Negritos. The Asiatic are found chiefly in the Malay Peninsula and in the Philippine and Andaman islands, and the African in a region on the continent extending about 200 miles north and the same distance south of the equator. A Negrito tribe has also been discovered in Dutch New Guinea. All pygmies of unmixed blood, whether Asiatic or African, have certain pronounced characteristics. These include, besides their short stature, closely curling hair, flattened nose, huge mouth, receding chin, an abundance of woolly hair on the body, and arms long in proportion to the legs. Generally speaking, pygmies resemble apes. The skin of Negritos is dark brown or black, while the Negrillos are of a reddish-yellow or chocolate-brown color. The Negrillos are the shortest human beings on the globe, averaging but four and one-half feet in height. Unlike the Negritos, they have very prominent abdomens.

Pygmies have the customs and habits of a primitive people. They wear little or no clothing, live in huts made of branches and foliage, and obtain their food by hunting and fishing. It is said, however, that the Negrillos surpass in intelligence the larger negro races of Africa. They speak a corrupt form of the language used by several neighboring tribes. The Malay Peninsula pygmies have a language of their own.

The name *pygmy,* which is from the Greek word for a measure of length corresponding to the distance between the elbow and knuckles, was first used by Homer in the *Iliad.* He applied it to a race of dwarfs whom he described as living in a region far to the south.

Consult Keane's *Man: Past and Present.*

PYLE, *pile,* HOWARD (1853-1911), an American painter and author, one of the best illustrators his country ever produced. His illustrations for children, a line of work in which he excelled, his pictures of old colonial days and his representations of life on the sea are all characterized by vigor, simplicity and directness, and he was equally successful with pen-and-ink work, wash drawings and oil paintings. His first important picture, *The Wreck in the Offing,* was bought by *Harper's Monthly* for seventy-five dollars, and was the first of his many contributions to that periodical. Pyle was born in Wilmington, Del. His art studies were pursued at a private Philadelphia school and at the New York Art Students' League. He taught for a time at the Drexel Institute in Philadelphia, where he had as a pupil the talented Maxfield Parrish (which see). He died in Florence, Italy. Among the books which he wrote and illustrated are *Merry Adventures of Robin Hood, Twilight Land, The Garden Behind the Moon, The Story of Sir Launcelot* and *Stolen Treasure.*

PYM, *pim,* JOHN (1584-1643), an English statesman who took an active part in opposing the tyranny of Charles I. He belonged to the Puritan party (see PURITANS), and was one of its most influential members. Pym was elected to both the Short and Long Parliaments, and while the latter was in session he led the movement to impeach the Earl of Strafford (see STRAFFORD). In 1642, the year before his death, his arrest, together with that of four other members, was sought by Charles I, who entered the halls of Parliament in person to apprehend them. They, however, had been forewarned, and when the king called for the unruly members, particularly John Pym, he found their places vacant. Pym's participation in the civil war between king and Parliament ended only with his death.

PYORRHOEA, *pi o re'a.* See TEETH, subhead *Pyorrhoea.*

PYRAMID. A solid whose base is a polygon, and whose faces are triangles all of which meet at a common point, is called a *pyramid.*

When the base of a pyramid is a regular polygon, as a square, an equilateral triangle, or a regular pentagon, and the faces are equal isosceles triangles, the pyramid is called a *regular pyramid,* as Fig. 1. The point where the faces meet (*a* in Fig. 1) is called the *vertex.* The perpendicular distance from the vertex to the base (*a c* in Fig. 1) is the altitude of the pyramid. The distance from the vertex to the middle point of any side of the base is the *slant height* (*a b* in Fig. 1).

Since each face is a triangle, its area is the product of one side of the base and one-half of the slant height. (The slant height is the

altitude of each triangular face.) *The area of the entire lateral surface of a pyramid is the product of the perimeter of the base and one-half the slant height.*

Volume. (*a*) Build of cardboard a prism and a pyramid of the same dimensions. Fill the pyramid with sand or sugar. Empty its contents into the prism. Do this until the prism is full. You will find that the prism holds three times as much as the pyramid. (*b*) Cut a prism and a pyramid of the same base and altitude, from clay, putty or from a potato. Weigh both. You will find that the prism weighs three times as much as the pyramid.

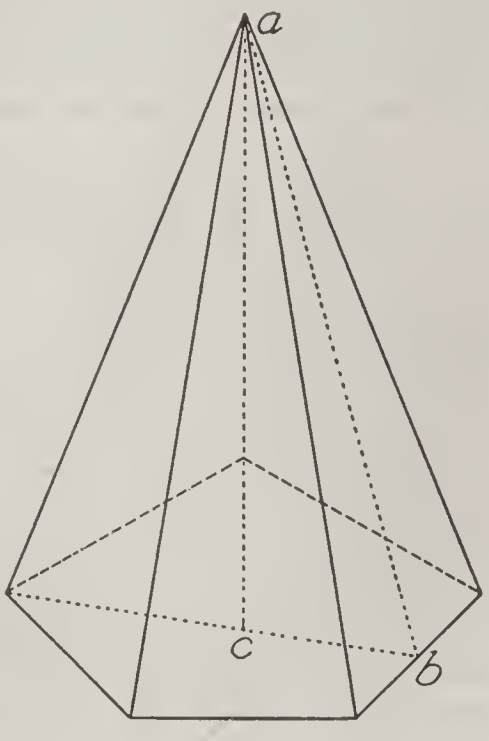


FIG. 1
Explanation appears in the text.

The volume of a pyramid is one-third as great as the volume of a prism of the same dimensions, or *The volume of a pyramid is the area of the base multiplied by one-third the altitude.* The formula is: Volume of pyramid $=\text{area of base}\times\frac{\text{altitude}}{3}$.

Problems. 1. How many square feet of sheeting on the sides of a steeple, a square pyramid in shape, with base 12 feet square and slant height 20 feet?

$$\text{Lateral surface}=\text{perimeter}\times\frac{\text{slant height}}{2}$$

$$\text{Number of sq. ft.}=(4\times12)\times20\tfrac{1}{2}=480$$

2. What is the volume of a pyramid whose base is 10 feet square and altitude 15 feet?

$$\text{Volume of pyramid}=\text{area of base}\times\frac{\text{altitude}}{3}$$

$$\text{Volume in cu. ft.}=10\times10\times15\tfrac{1}{3}=500$$

3. Find the lateral surface of a six-sided pyramid whose slant height is 30 feet and each side of whose base is 8 feet.

4. What is the volume of a pyramid whose base is a rectangle 10x15 feet, and whose altitude is 21 feet?

5. At $.45 a square foot, how much will it cost to gild a five-sided pyramidal steeple if the base is 10 feet on each side and the slant height is 16 feet?

6. A pyramid has as its base a right triangle with sides respectively 10 inches, 15 inches and 18 inches; its altitude is 24 inches. Find the volume of the pyramid and the number of square inches of lateral surface.

Frustum of a Pyramid. The part of a pyramid between the base and a plane which cuts the pyramid parallel to the base is called a frustum. (See Fig. 2.)

Lateral Area. Its lateral area is made up of trapezoids whose lower edges make the perimeter of the lower base of the frustum, and whose upper edges make the perimeter of the upper base of the frustum. *To find the area of the lateral surface of a frustum, multiply one-half the sum of the perimeters of the bases by the slant height.* See TRAPEZIUM.

Volume. To find the volume of a frustum, multiply one-half the sum of the areas of the two bases by the altitude (*the distance between the centers of the two bases,* or *a c* in Fig. 2).

Problems. 1. How many square inches of sheet iron are used in making a bread pan 8 inches by 5 inches at the bottom and 9 inches by 6 inches at the top, the slant height being 2½ inches? (The reader will note that it is the frustum of a rectangular pyramid.)

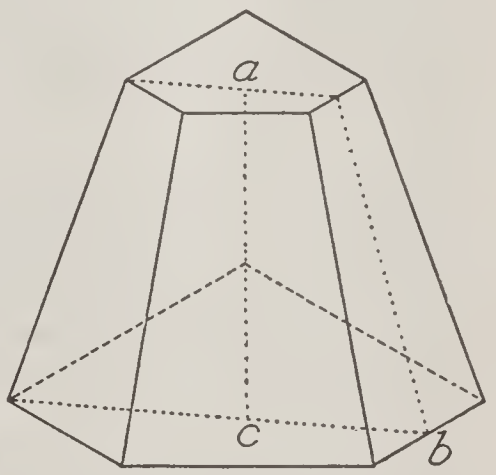


FIG. 2
See Fig. 1 for explanation of symbols.

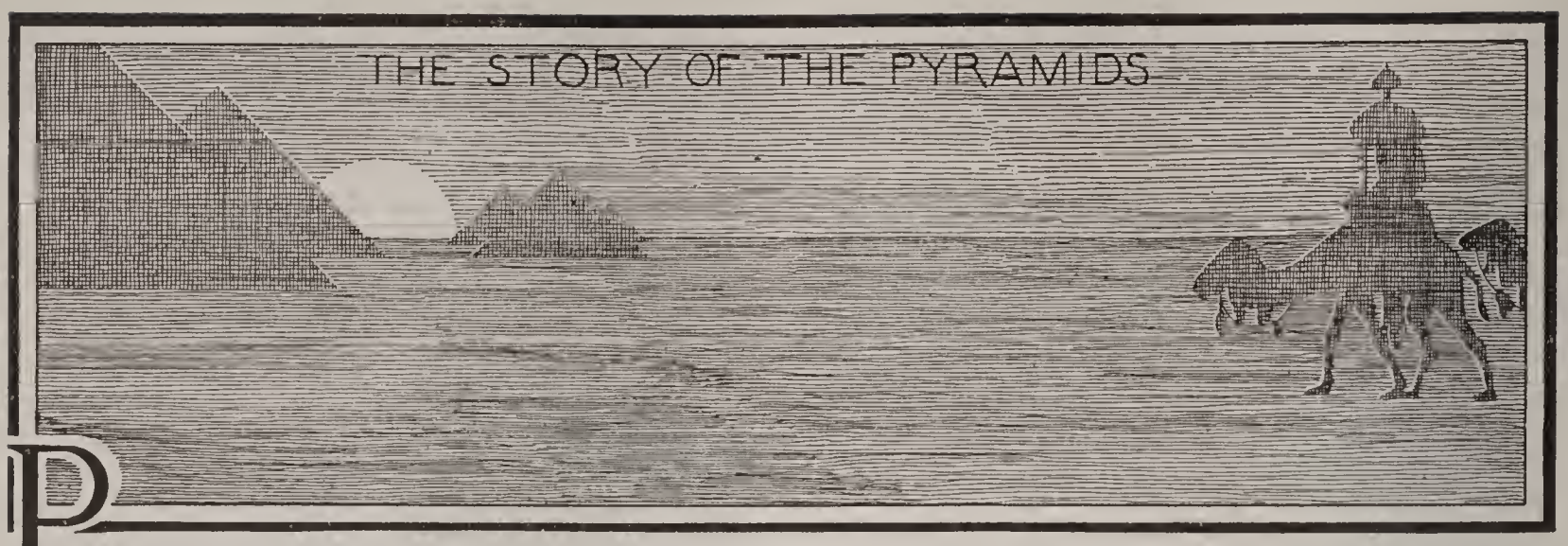
$$2\text{ perimeters}=2\times(9+6)+2\times(8+5)=56$$
$$\text{Lateral surface in sq. in.}=56\tfrac{1}{2}\times2\tfrac{1}{2}=70$$
$$\text{Bottom surface in sq. in.}=8\times5=40$$
$$\text{Number sq. in. of sheet iron}=110$$

2. How many cubic inches in the volume of a tin box whose lower base is 10 inches square, whose upper base is 6 inches square and whose altitude is 8 inches?

$$\text{Area of 2 bases}=(10\times10)+(6\times6)=136$$
$$\text{Volume in cu. in.}=136\tfrac{1}{2}\times8=544$$

3. Find the area of the lateral surface of a frustum of a regular pyramid whose lower base is a square 10 feet on a side, upper base 5 feet on a side, and slant height 16 feet.

4. A monument in the form of a frustum of a square pyramid contains 445 cubic feet of stone. The lower base is 8 feet on a side, the upper base 5 feet on a side. What is the height of the monument? A.H.



PYRAMIDS, *pir'a midz,* the royal tombs of ancient Egypt, gigantic structures that have been in existence since the early period of human history. The most famous—a group of three near Gizeh—were numbered among the Seven Wonders of the Ancient World, and the modern age still marvels at them. Says the historian Myers:

> These venerable memorials of the early world, although they stand so far back in the gray dawn of the historic morning, mark not the beginning but in some respects the perfection of Egyptian art. They speak of long periods of human life, of ages of growth and experience, lying behind the era they represent.

Another point of view is expressed by the travel lecturer, Burton Holmes:

> Eloquent of the wealth and power of those kings, they represent the suffering, pain and toil of dumb, uncounted multitudes of slaves—they are the highest, costliest, cruelest tombs the world has ever seen.

The celebrated Gizeh pyramids are located about five miles west of Gizeh, on the border

The tapering Pyramids, the Egyptians' pride,
And wonder of the world. —BLAIR.

In the illustration the view is westward across the Nile.

of the Libyan Desert. The largest of these, the Great Pyramid, was erected by Khufu, whom the Greeks called Cheops. He was the second king of the fourth dynasty, and lived, probably, twenty-nine centuries before the Christian Era. Herodotus, the Greek historian, is authority for the statement that it took 100,000 men twenty years to erect the Great Pyramid. Its base covers thirteen acres, and its triangular sides rise to an apex 451 feet (perpendicularly) above the ground. One Egyptologist has estimated that this massive structure—the largest piece of masonry ever built—contains 2,300,000 stone blocks, which have an average size of forty cubic feet. The weight of the structure is estimated to be not less than 6,848,000 tons. Ages ago the pyramid had an outer casing made of polished stones, all carefully fitted together, but this has long since disappeared, leaving exposed the central core of rough-hewn blocks. Before the smooth covering was worn away it was thought that there were but two things that could reach the top of the pyramid—the eagle and the reptile—but now,

> "The mighty pyramids of stone
> That wedgelike cleave the desert airs,
> When nearer seen and better known
> Are but gigantic flights of stairs."

The sides are climbed by hundreds of tourists, assisted by white-robed Arab guides. The apex has lost some of its crowning blocks, and one finds on reaching the top a level platform thirty-six feet square. The original height of the pyramid was 481 feet.

The entrance leading to the interior passage is in the north side of the structure, about forty-eight feet above the ground. This passageway descends gradually to a horizontal corridor which opens into an underground chamber. From this room a sloping, blind passage leads to an ascending corridor which opens into the Chamber of Queens and the Great Hall. The latter, a high, narrow vault, terminates in another narrow passage which leads to the King's Chamber. This, the most marvelous of the interior rooms, is lined with polished granite and contains the crumbling stone coffin of the king.

The Second and Third Pyramids of the Gizeh group are also massive structures, their perpendicular heights being 450 feet and 204 feet respectively. The second was built by Chephren, the successor of Cheops, and the Third by Mycerinus, the successor of Chephren. There are three small pyramids south of the last named,

SIZE OF STONES IN THE GREAT PYRAMID

In the Great Pyramid there are 2,300,000 stones. Their average weight is two and a half tons each, but some of them weigh fifty tons each. The builders displayed an accuracy almost equal to opticians' work, but on a scale of acres instead of inches. The blocks were fitted and squared with an accuracy seldom equaled in building operations to-day. How the immense rocks were hoisted to their places is not known.

supposed to have been erected for other members of the Royal family. There are in existence about seventy-five Egyptian pyramids, arranged in groups that extend in a north and south direction from Abu Roâsh to Medum, on the west side of the Nile. Many of these are in ruins, but all are interesting subjects for study. B.M.W.

Consult Petrie's *Pyramids and Temples of Gizeh;* Proctor's *The Great Pyramid.*

PYRAMUS, *pir' a mus,* **AND THISBE,** *thiz' be,* in Greek legend, two unfortunate young lovers whose home was in Babylon. They lived in adjoining houses, but their parents were so averse to the idea of their marriage that they were not allowed to see each other and had to carry on their courtship through a small opening in the wall. Finally, they planned to meet by moonlight beneath a certain mulberry tree outside the city. Thisbe arrived first, but was frightened by a lion and fled, dropping her veil, which the lion caught and tore with his bloody mouth. When Pyramus reached the spot some time later, he saw the lion and the blood-stained veil, and fancying that Thisbe had been killed, stabbed himself with his dagger. Thisbe on her return found his deady body, and seizing the dagger, plunged it into her own bosom. The fruit of the mulberry tree, which had up to that time been white, changed to blood red.

PYRENEES, *pir' e neez,* a mountain chain which forms an almost impassable barrier between France and Spain. The Pyrenees extend from east to west for a distance of 280 miles—from the Bay of Biscay to the Mediterranean—and cover an area of over 20,000 square miles. Their average height is only about 3,500 feet, but in the central ranges there are several peaks over 10,000 feet in altitude. In this section the culminating point of the mountains is reached in Mont Maladetta, which is 11,168 feet above the sea. Most of the glacier fields on the Pyrenees are found on the northern slopes of the central ranges, the total glacial area being considerably less than that of the Alps. The scenery of the Pyrenees, too, is inferior in grandeur to the Alpine. As there are but two passes across these mountains that are suitable as wagon roads—the Col de la Perche and the Col de Somport—the chain as a whole is a barrier to commerce, and France and Spain trade with each other chiefly by sea. On the northern slopes of the mountains there are several well-known watering places, and on the south slope of the Eastern Pyrenees is Andorra, one of the smallest republics in the world. See ANDORRA.

Consult O'Connor's *Travels in the Pyrenees;* Baring-Gould's *Book of the Pyrenees.*

PYRITE, *pi' rite,* or **PYRITES,** *pir' ri teez.* History tells us that the first settlers who came to Jamestown, Va., in search of gold discovered a yellow substance in the rocks of that vicinity which they took for the treasure they were seeking. They mined a shipload of this substance and sent it to England, so the story goes, believing they had become immensely wealthy; but when this "gold" was tested by fire it separated into a black, worthless mass, and a volume of ill-smelling gas. This substance was *pyrite* or *iron pyrite,* a compound of iron and sulphur, which because of the incident mentioned, and others like it, is often termed *fool's gold.* Pyrite has a brassy, yellow color, and is very hard and brittle. It often occurs in crystals in the form of cubes, and forms beautiful cabinet specimens. Most of it, however, occurs in veins in rock. It is used extensively in the manufacture of sulphuric acid (which see). Copper pyrite is a compound of

copper and sulphur, is of a darker yellow than iron, and may be smelted for the copper. It sometimes contains small quantities of gold and silver.

PYROXENE, *pi'rok seen,* a mineral closely related to hornblende (which see) and composed chiefly of silica, calcium and magnesium. It crystallizes in four-sided prisms which are nearly square. Some varieties are arranged in layers. Pyroxene crystals are found in limestone, dolomite and occasionally in igneous rocks. The color of this mineral ranges from pure white to green, brown and black, depending upon the presence of magnesium, manganese, iron or aluminum in the composition. Augite is a variety of pyroxene, black, greenish-black and dark green in color, which enters largely into the formation of igneous rocks.

PYRRHUS, *pir'us* (about 318-272 B. C.), a Greek military leader, declared by some authorities to have been a distant relative of Alexander the Great. During his youth he recovered the throne of Epirus, which his father had lost, but Pyrrhus himself was deposed by his people in 302 B. C. He was forced to take refuge with Demetrius Poliorcetes, serving as his hostage in Egypt after the fatal battle of Ipsus. After marrying the daughter of Ptolemy Soter, Pyrrhus returned to his native country, recovered the throne and undertook the conquest of Macedonia. His friend Demetrius attacked him after he had obtained possession of the western part, but Pyrrhus was successful and ruled over the kingdom with Lysimachus, until he was expelled.

The Tarentines, a Greek colony of lower Italy, and their neighbors, appealed to Pyrrhus in 281 B. C. for aid against the surrounding enemies. Pyrrhus hastened to their assistance with 25,000 men and twenty elephants; the Romans were conquered, chiefly because of the part the large elephants played in the battle. In 279 B. C. he won the Battle of Asculum, the famous "Pyrrhic victory;" although he conquered his foe it was with so great a loss that as he surveyed the thousands of dead he remarked, "Another such victory and I shall be ruined."

Later, he assisted the Greeks of Sicily against the Carthaginians, at first successfully, but met a heavy defeat in 275 B. C. During the last three years of his life he renewed his invasions of Macedonia, led an army into the Peloponnesus, and unsuccessfully attacked Sparta. At Argos he met Antigonus of Macedon in a pitched fight and was killed.

Consult Mahaffy's *Alexander's Empire.*

PYTHAGORAS, *pi thag' o ras,* a Greek philosopher who lived in the sixth century B. C. Little is known definitely of his life or teachings, but it seems certain that he was born on the island of Samos and that he founded, in the Greek city of Crotona, in Italy, a brotherhood among the aristocrats of that place. A fundamental proposition of geometry is known to have been first proved by him. This is the theorem that the square on the hypotenuse of a right-angled triangle is equal to the sum of the squares on the other two sides. Mathematicians call it the *47th problem in Euclid.* The philosophy of Pythagoras seems to have included a belief in the transmigration of the soul. There is also connected with the Pythagorean school the idea that the earth is a sphere and that it revolves about a central fire. The Pythagorean brothers, being aristocrats, were looked upon with suspicion by the members of the radical popular party of the period, and in a political uprising most of them were killed. It is not known whether Pythagoras perished in the outbreak, or whether he had withdrawn to Metapontum before the uprising and died there.

Consult Burnet's *Early Greek Philosophy;* Fink's *Brief History of Mathematics.*

PYTHIAN, *pith'i an,* **GAMES,** a national festival of the ancient Greeks, celebrated in honor of Apollo, at Delphi, near the shrine and oracle of the god. The name had reference to the dragon Python, the slaughter of which was the first exploit of Apollo (see APOLLO; PYTHON). The games were the second of the four great national festivals, the others being the Olympian, the Nemean and the Isthmian. At first the Pythian games were celebrated every ninth year and consisted merely of a contest between singers, but a new series was inaugurated in 586 B. C. Thereafter the celebration occurred every four years, and there were added to the musical contests athletic contests and horse racing. Eventually, dramatists, historians, poets and artists competed for honors. The prizes were the laurel wreath and the palm branch.

Related Subjects. The reader is referred to the following articles, in addition to those mentioned above:

Athletics	Nemean Games
Isthmian Games	Olympian Games

PYTHIAS, *pith'i as.* See DAMON AND PYTHIAS.

PYTHIAS, KNIGHTS OF, a fraternal and benevolent order, originally based, as its name

suggests, on the story of the self-sacrificing friendship of Damon and Pythias. It is confined to the United States and Canada, and in point of numbers ranks next to the Odd Fellow and Masonic orders.

The society was founded in 1864 in Washington, D. C., by Justus H. Rathbone, and the membership of the first lodge was composed largely of government clerks. In accordance with the name, members are pledged to help each other, "friendship to the death" being the theoretical ideal, and the society has since its establishment paid out over $50,000,000 in benefits. An endowment department, in which membership is voluntary, cares for an insurance feature; a uniform branch exists with semimilitary features, such as drilling and marching.

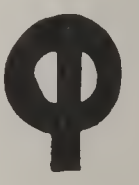
The government is vested in a single supreme lodge, below which there are grand lodges and subordinate lodges. The pledges of secrecy taken by members are extremely strong. Three ranks or degrees are conferred in the Pythian society, those of page, esquire and knight. In 1917 the membership of the society was 729,053, of whom 70,952 were members of the insurance branch, and 17,529 of the military branch.

PYTHON, *pi'thon,* a powerful, giant snake, belonging to the same family as the boa. Many exaggerated stories of the huge bulk of the python have been told, but it is true that its loosely-hinged jaws enable it to swallow whole the body of a sheep or goat. The snake has no poison fangs. With the exception of one branch, this group of snakes inhabits the eastern hemisphere. They may possess more than 400 vertebrae and attain a length of thirty feet. They are frequently found suspended from trees near the water, lying in wait for animals which seek to quench their thirst. Coiling their bodies around these victims, they reduce them to a shapeless mass, and then they swallow them whole. The female python lays her hundred or more eggs in a heap, coils herself around them and so remains for about two months, until they are hatched. These huge snakes inhabit India, Ceylon, Africa, Australia, Mexico and Central America. They can be easily tamed. See Anaconda; Boa.

PYTHON, a famous serpent which, in the Greek myth, was said to have been born from the mud and foul waters which remained on the earth after Deucalion's flood. This hideous monster lived near Delphi, and preyed upon the cattle and even the people of the surrounding country. Apollo, when he came to Delphi, killed the animal with his arrows, and thereafter the place and the oracle of Apollo were given the name of Pytho. Originally this was a nature myth; the poisonous serpent was the miasmatic fog from the winding swamp, which was dispersed by the sun's rays. The sun was represented by Apollo.

THE WORLD BOOK
ORGANIZED KNOWLEDGE IN STORY AND PICTURE
TRADE MARK REGISTERED

Qq



Q is the seventeenth letter of the English alphabet. In the original Phoenician from which the letter was taken its name was *qoph,* which meant *head,* and in form it was a rude sketch of the back of the head and neck—nothing more than a circle with a short, vertical line running through it. It represented a somewhat different sound from the *kaph,* from which modern *k* is taken; but when the Greeks took over the alphabet they had no sound for it, and it fell into disuse. The Romans, on the other hand, adopted it and made use of it in combination with *u,* as it is used in English to-day. In reality, it is an entirely superfluous letter in English, for its place could be filled by *kw* in all ordinary words, as *queen,* and by *k* alone in such occasional words from the French as *coquettish.* *Q* exists in English, therefore, solely because the Phoenicians had need of it to represent a sound distinct from *k.*

QUADRANT, *kwod'rant,* an instrument formerly used in navigation and in surveying for ascertaining the altitude of the sun. The name was given it because the instrument embodied an arc of 90°, or one-fourth of a circle. It has been almost entirely superseded by the sextant (which see).

QUADRILATERAL, *kwod ri lat'er al,* a plane figure bounded by four straight lines. A quadrilateral whose opposite sides are parallel is a *parallelogram.* Its opposite sides being *parallel,* it follows that they are *equal,* and that its opposite *angles* are *equal.* If the angles of a parallelogram are right angles, the figure is a *rectangle;* if the sides of a rectangle are equal, the figure is a *square.* A parallelogram whose *opposite* sides (only) are equal and whose angles are oblique (not right angles) is a *rhomboid.* When all the sides of a parallelogram are equal and its angles are oblique angles, the figure is a *rhombus.*

A quadrilateral having only one set of parallel sides is a *trapezoid.* If the nonparallel sides are equal, the trapezoid is isosceles. A quadrilateral having no sides parallel is a *trapezium.*

Trapezoid and Trapezium. Mathematicians do not agree on the meaning of these two terms. The above definitions are those accepted generally in the United States to-day, while in England the quadrilateral having two parallel sides is called a *trapezium* and the quadrilateral having no parallel sides is called *trapezoid.* The terms are often used interchangeably in the United States. A leading writer defines a trapezoid as "a quadrilateral having one pair of sides parallel," and then adds, "It is seen by this that a parallelogram is a trapezoid."

Related Subjects. The reader is referred to the following articles in these volumes

Mensuration
Rectangle
Rhombus
Square
Trapezium

QUADRILLE, *kwah dril',* the name of a dance of French origin, usually danced by four couples in a hollow square. It was introduced into England in 1815, and from that country into the United States, where it succeeded the stately minuet, and at once became immensely popular. First danced in ballets by groups of four, eight or twelve all similarly dressed, it was taken up by society and no ball was considered complete without the quadrille. There are five distinct evolutions or figures performed in turn by each of the four couples. The five figures were given appropriate names, which of course often varied in different places, the original names being Le Pantalon, l'Été, La

Poule, La Trénitz, La Pastourelle. In the quadrille dances in the United States the five figures are sometimes called La Promenade, Le Moulinets, Les Chevaux de Bois, La Passe and La Corbeille.

The writing of music for quadrilles developed into a high art, and the quadrille held the popular fancy for longer than any other single dance, with the exception of the minuet (which see). The steps and movements of the quadrille are graceful and more dignified than those of modern "round" dances, though it has now been almost entirely superseded by the waltz, the two-step and the more modern dances which have largely supplanted the two latter, such as the tango, the hesitation waltz and the like. See DANCING.

QUAESTOR, *kwes'tor,* an ancient Roman magistrate. When authentic history began in Rome, the consuls were the executive officers of the republic, and as such they had charge of criminal and financial matters. The quaestors soon appeared as assistants to the consuls, and were at first probably appointed by them to act as their representatives in some matters, and they always stood in special relations to the consul. At first their functions seem to have been mainly concerned with criminal matters, in which they were judges or presidents of trial courts, but later, and under the Empire, their duties were mainly of a financial nature, for they served as state treasurers. Their number at first, like the consuls, was two; under the Empire they increased to twenty, as necessities of state required.

Consult Greenidge's *Roman Public Life.*

QUAIL, *kwail,* a family of North American game birds which includes about sixty species. The best-known member of the group is the bird which is called *bobwhite* in the Northern and Eastern United States and *partridge* in the South (see article PARTRIDGE for illustration).

The bobwhite, so-called from its clear, whistling notes (*ah bob-white,* with the last syllable sharply accented), is the only species of quail found east of the Mississippi River, its ordinary range extending from the Gulf states to Southern Ontario. It is ten inches in length and has reddish-brown plumage, with markings of black, white and buff, aptly described as a "speckled jacket." The bobwhite is a bird of the grasses rather than the trees, and its nest is always found on the ground. There are ten to eighteen pure white eggs in a brood. Weed seeds comprise half the food of this quail, and the remainder consists of grain (from the stubble), wild fruits and insects. It devours such pests as chinch bugs, grasshoppers, the cotton boll weevil, army worms and cutworms, 140 different species in all, thus proving itself a true friend of the farmer. The flesh of the bobwhite is a popular table food, and so many of the birds have been killed by hunters that many states have adopted laws restricting their destruction.

Other species of American quail are the *California, Gambel's, mountain, blue* and *Massena.* The mountain is the largest and the Massena the smallest of the group. All have noticeable crests and beautiful plumage, slate-blue, olive-brown and black and white being prominent colors. They are found in the Western and the Southwestern states. Most of the other members of the family are tropical birds.

There are also several species of small game birds found in Europe and Asia, to which the name quail is applied.

QUAKERS, *kwayk'erz,* or **SOCIETY OF FRIENDS,** a Christian sect founded in England about 1648, by George Fox (which see). The members of this body have always called themselves Friends; the name Quaker, bestowed in derision, originated in Fox's exhortation to the magistrates to "tremble at the word of the Lord." Notwithstanding severe persecution, both in the British Isles and in America, where the Quaker movement took root in 1656, the Society of Friends spread rapidly. Pennsylvania Colony was founded by a famous Quaker, the good William Penn (which see), and the denomination exercised considerable influence in colonial days in several of the other middle colonies.

FIRST QUAKER MEETINGHOUSE

The illustration, drawn from an old engraving, is that of the first house of worship of the Society of Friends in America.

In the United States a division occurred in the ranks of the Friends in 1827, when Elias

Hicks began preaching a denial of the miraculous birth of Christ and advanced other views deemed unorthodox. The followers of Hicks are known as Hicksite Quakers, and the original body as Orthodox Quakers. At the present time there are in the United States about 98,000 members in the Orthodox branch, and about 20,000 in the Hicksite. (The Hicksites themselves prefer the name Liberal Branch.) Another group of separatists, the Wilburites, who differ from the general body in regard to certain points of discipline and administrative methods, number about 3,900. There are about 4,000 Friends in the Dominion of Canada. In Great Britain, Australia and Ireland the members of the Orthodox branch number 22,350.

Originally the Quakers were set apart from other Christian sects by several marked peculiarities. They dressed simply in gray, used the "thee" and "thou" forms in daily conversation, and conducted their religious services in accordance with their belief that no one should take part until he felt called upon to do so by the Holy Spirit. In many sections, however, these customs have been greatly modified or abandoned. There are other points from which they have not deviated. They believe only in a spiritual observance of baptism and the Lord's Supper, not in an outward celebration of these sacraments. Probably the central point of their teaching is the doctrine that the individual is personally directed by the Holy Spirit—the "Inner Light." They believe the taking and administering of oaths to be contrary to Christ's teaching, and they are equally opposed to war in any form. Their principle of nonresistance has at times subjected them to injustice and persecution. In general, the Quakers have exercised a beneficial influence wherever they have settled. B.M.W.

Consult Holder's *The Quakers in Great Britain and America;* Rowntree's *The Society of Friends: Its Faith and Practice.*

QUANTITY, *kwahn'ti ti.* When anything has size, weight, number, mass or volume which may be measured, increased or diminished, it has quantity. The term may also mean a certain or considerable amount, as in the sentences:

(1) Quantities of these shells are found on the shore.

(2) He bought a quantity of rubber in South America.

In mathematics, numbers are numerical quantities (see NEGATIVE QUANTITY; also, ALGEBRA, page 187). In prosody, quantity signifies the relative length of time occupied in pronouncing a syllable; in music the quantity of the note denotes the relative length of time it is held.

QUAPAW, *kwah'paw,* from the Indian word *Ugákhpa,* meaning *downstream people,* is the name of a tribe of Sioux Indians forming one of the two divisions of the Dhegiha group, the other being the Omaha. When the tribes separated the Quapaws supposedly went down the Mississippi River and the Omaha group up the Missouri. The earliest-known history of these Indians begins with the chronicles of De Soto's expedition in 1539-1543. The remnant of the tribe, numbering about 300, live on a reservation in Oklahoma. For their customs, see INDIANS, AMERICAN.

QUARANTINE, *kwahr'an teen,* a term now used to signify the isolation of persons, places, animals and effects which carry, or are reasonably supposed to carry, danger of infection. The period of quarantine depends on the particular disease to be guarded against. Originally the term applied only to the forty days during which ships suspected of carrying infection were held outside of ports and forbidden to land passengers or freight.

International Quarantine. At the present time all ships entering port are quarantined; they are boarded by an inspecting officer of the government, who receives from the officer in command a statement as to the health of crew and passengers. Heavy penalties may be inflicted for false statements or for concealment of facts. According to the officer's report the ship receives either a *clean bill* or a *foul bill,* and either proceeds to its wharf without delay or is quarantined for the time specified in regulations for the various diseases. If the ship has been detained by contagious disease, every part of the vessel, as well as the cargo, is disinfected before it can proceed to its wharf. The quarantine station is always established at some distance from the landing places.

A ship under quarantine flies a yellow flag by day, and at night a white light is displayed at the masthead. Reasonable charges may be made for quarantine services, without recovery, but vessels or owners of vessels acting as carriers are exempt from responsibility or liability for nondelivery or delayed delivery of cargoes, if such arise from quarantine.

State and Municipal Quarantine. The term quarantine also applies to rules and regulations adopted by a state, province or municipality to prevent or restrict the spread of infectious dis-

ease within its borders. General government regulations provide for protection of a country as a whole; each smaller political division, down to the municipality, may and does take steps to defend itself individually against infectious diseases. The power vested in the authorities for quarantine purposes is practically, and within reason, unlimited, even overriding, when considered necessary, personal property rights. No recovery can be made from state or municipality for destruction of property or premises when quarantined and destroyed by order of the duly-appointed health official, but if that official wilfully exceed his duty or powers he may be held personally liable.

Consult Baker's *Laws Relating to Quarantine;* Parker and Worthington's *Public Health and Safety.*

QUARRY, *kwahr'ri,* **AND QUARRYING.** A *quarry* and a *mine* differ in but two essentials. The former is an excavation in the earth, open to all observers, from which are taken large masses of rock of peculiar quality, such as marble, granite, limestone, sandstone and other like building stones. A mine, while it is an excavation, is not visible from the surface of the earth; the excavation is often over half a mile below the surface and is reached by shafts sunk to the various levels, where workmen seek metals and minerals. Such is the legal aspect of the two terms.

The operations by which valuable rocks in huge masses are taken from their natural locations and prepared for commercial purposes are known as *quarrying.* There are two processes which are employed in a quarry. One is known as the "plug and feather" method; the other, the explosive method.

Plug and Feather Method. Pressure, constantly increased and exerted uniformly, will split a mass of rock along a line of cleavage. By employing such means workmen can break rock into such masses and into such shapes as suit their needs; the use of explosives, on the contrary, while sure to detach large masses, may destroy much valuable stone by breaking it into pieces too small for their intended use.

The principal tools in the plug and feather method are a wedge, or plug, flat on its two opposite surfaces, and two "feathers," each rounded on one side and flat on the other. Into the rock in a straight line at short intervals holes about three-fourths of an inch in diameter are drilled. A plug is placed between two feathers and these three pieces are inserted in a hole. When all the holes along the line where the rock is to be broken are thus filled, the workmen begin to drive the plugs and feathers downward. Each of the wedges thus formed is driven only a little way at a time, and thus the pressure is kept practically uniform; eventually it is so great that the rock breaks.

The mass thus released is turned over to other workmen, who may in turn subject it further to the plug and feather process, or they may break it into smaller pieces by such hand tools as drills, picks, hammers and wedges. Still another class of artisans, more skilled and possessed of the artistic sense, work the smaller pieces into merchantable forms. When large pillars, columns and the like are prepared, machinery is employed in rounding and polishing them.

Explosive Method. Usually this is employed in detaching great masses of rock from their beds, and for this process either dynamite or gunpowder, connected at a safe distance with a slow-burning fuse, is commonly used, the choice depending upon the results sought from the explosion. If finely-broken pieces of stone are desired, and these are to be further crushed for road making, for manufacturing concrete, and the like, dynamite acts powerfully. When stones of as large size as possible are sought, the milder explosive is employed. In either instance drill holes are sunk deep into the solid mass of rock parallel to the exposed perpendicular face of the mass; into these the explosive is then poured and electric wires are connected with each charge. The explosions resulting when the charges are fired are thus simultaneous, and sometimes hundreds of tons are thus forced out in a few very large pieces.

Extent of the Industry. Of granite, limestone, marble and sandstone quarries in the United States there were in 1920 a total of 1,922 enterprises; the leading ones follow:

Granite	381	Marble	48
Limestone	925	Sandstone	276

The principal producing states in each commodity, with the number of quarries credited to each, were as follows:

Granite. Those states possessing over thirty quarries are California, 62; Connecticut, 38; Georgia, 32; Louisiana, 85; Massachusetts, 82; Minnesota, 35; New Hampshire, 40; North Carolina, 32; Pennsylvania, 43; Vermont, 51.

Limestone. The states with over thirty quarries producing this popular building stone are Illinois, 81; Indiana, 126; Iowa, 90; Kansas, 102; Kentucky, 83; Minnesota, 90; Missouri, 144; New York, 127; Ohio, 144; Pennsylvania, 311; Tennessee, 49; Wisconsin, 110.

Marble. There are marble quarries to the number of five or more in each of the following states: California, 9; Georgia, 5; Massachusetts, 8; New York, 10; Pennsylvania, 5; Tennessee, 18; Vermont, 13.

Sandstone. The states with twenty or more sandstone quarries are California, 20; Colorado, 35; New York, 50; Ohio, 52; Pennsylvania, 172; West Virginia, 27; Wisconsin, 39.

Production in Canada. The Dominion government does not make a detailed report of the number of quarries operating in the various provinces, but it publishes an annual report covering the value of the products of all quarries. The average value of the granite, limestone, marble and sandstone, for a period of five years, appears in the following table:

PROVINCE	GRANITE	LIMESTONE	MARBLE	SANDSTONE	TOTAL
Nova Scotia	$ 24,258	$ 245,216	.....	$ 23,440	$ 292,914
New Brunswick	37,994	110	.....	35,337	73,441
Quebec	462,678	1,296,577	$135,187	450	1,894,892
Ontario	131,816	680,461	25,996	54,032	892,305
Manitoba	2,268	315,782	.....	.....	318,050
Alberta	.....	.....	.....	158,344	158,344
British Columbia	460,851	56,780	1,600	179,580	698,811
Total	$1,119,865	$2,594,926	$162,783	$451,183	$4,328,757

Consult Foster's *Elements of Mining and Quarrying;* Gillette's *Rock Excavation: Methods and Cost.*

Related Subjects. The attention of the reader who is interested in this subject is called to the following articles in these volumes:

Building Stone	Limestone
Carrara Marble	Marble
Granite	Sandstone

QUART, a measure of capacity used in the United States, Canada and Great Britain for measuring both dry and liquid substances. (For tables, see page 1765 in the article DENOMINATE NUMBERS.) In the United States the liquid quart is equal to one-fourth of a gallon and to .9463 liters, and contains 57.75 cubic inches; the dry quart is equal to one-thirty-second of a bushel and to 1.101 liters, and contains 67.2 cubic inches. Quarts in both measurements are divided into two pints. A vessel 4 x 4 x 3.6 inches will hold a liquid quart. The British imperial quart, both dry and liquid, contains 69.3185 cubic inches. See WEIGHTS AND MEASURES; METRIC SYSTEM.

QUAR'TER-DECK, that part of the upper deck of a boat lying between the stern and mainmast, which in men-of-war is reserved for the use of officers alone. It has consequently become a symbol of authority, and according to an old custom of the sea, it is saluted by all who step upon it, the officers present returning the salute. The forward part of the right side, or starboard, is reserved for the senior officer. A sailor who came to the quarter-deck with a complaint always stood near the mast at the forward end of the deck; thus he was said to "come to the mainmast"—an expression still heard among seamen.

QUARTZ, *kwahrtz,* a mineral that when pure looks much like glass. When found in small fragments, it is sometimes mistaken for it. Quartz crystals are in the form of six-sided rods, with six-sided pyramids at the end. They are so hard that you can easily write your name on glass with one. Quartz is the most abundant of all minerals and enters into the composition of many rocks. It is easily recognized in granite by its resemblance to broken glass. Sandstone consists of fine particles of quartz cemented together by some other substance. See SANDSTONE.

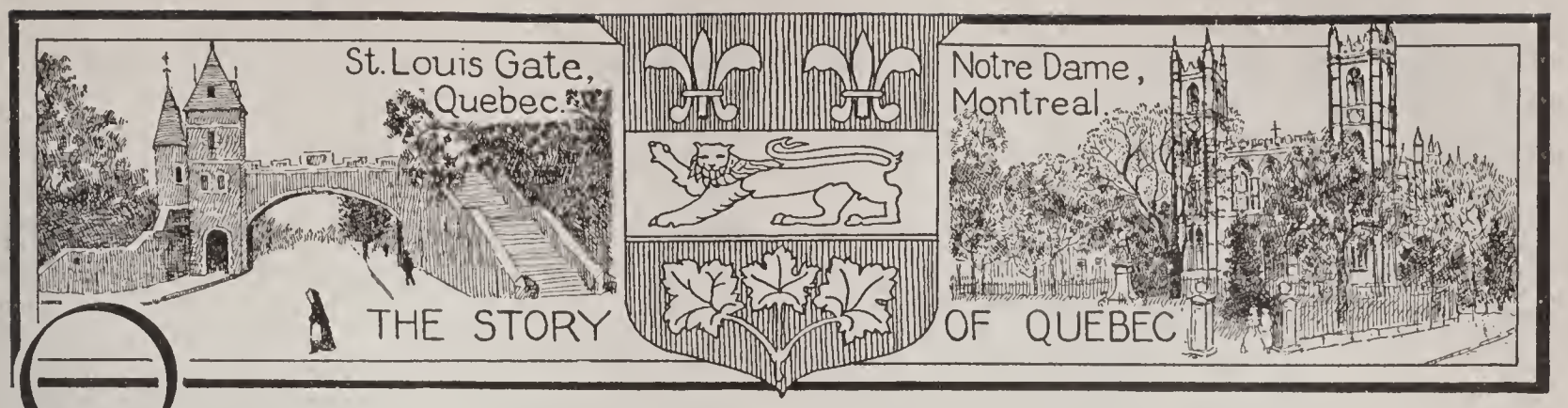
There are many varieties of quartz. When pure it is clearly transparent. Pure quartz crystals under the name of *rock crystal* are sometimes used for spectacle lenses. Purple quartz is known as *amethyst;* other varieties are also classed as precious stones, among them being *agate, cornelian* and *chalcedony* (see PRECIOUS STONES). Common varieties vary in color from milky white to black. The waters of some hot springs dissolve quartz and deposit it at the mouth as they evaporate; many of the beautiful formations about the hot springs in Yellowstone National Park are formed in this way. The variations in color are due to the presence of other minerals in the water.

Quartz, in the form of sand, is an important constituent of soils (see SOIL). It is also extensively used in the manufacture of glass.

QUATERNARY, PERIOD, the name which geologists formerly gave to that period of geologic time which included the Glacial Period and the Present or Human Period, known more popularly as the Age of Man. The term is now but little used.

Related Subjects. The reader is referred to the following articles in these volumes:

Cenozoic Era	Glacial Period
Geology	Human Period



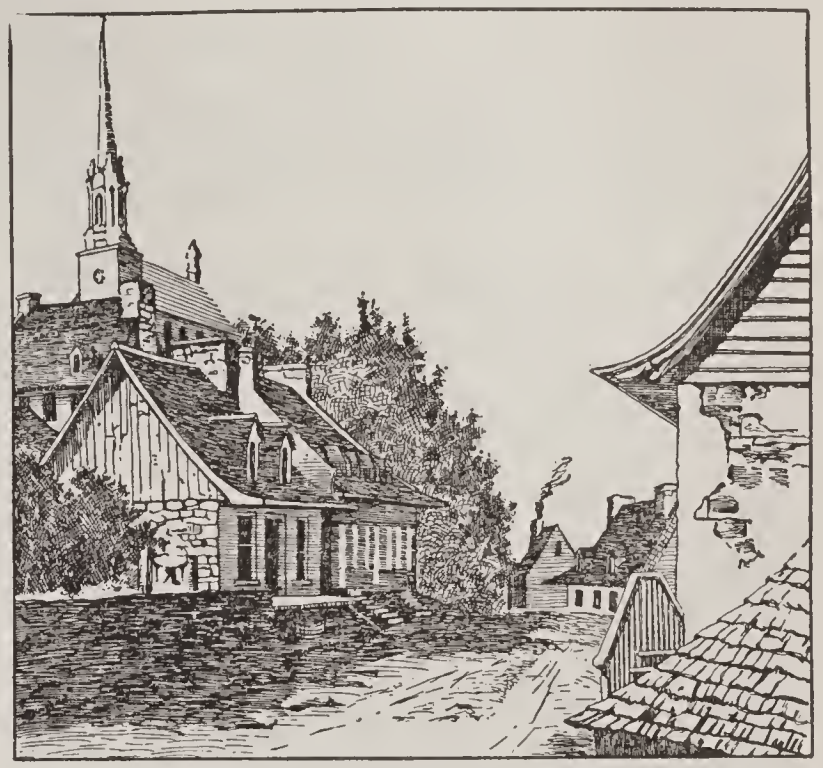
QUEBEC, *kwe bek'*, formerly LOWER CANADA or CANADA EAST, is the oldest and the largest province of the Dominion of Canada, and the home of nearly two millions of people, who for more than a century and a half have to the minutest detail preserved their language, their religion, their social customs and their laws, making of themselves a nation within a nation. It is the only province that is not prohibition territory.

Location and Extent. Quebec is bounded on the south by Ontario, a corner of New York, the Northern New England states, New Brunswick and Chaleur Bay. It extends eastward to the Atlantic Ocean and northward to Hudson Strait, and the greater part of its western boundary is formed by Hudson and James bays, the remainder by Ontario. Labrador, a long, narrow strip of coast belonging to Newfoundland, separates it from the ocean on the northeast. Its most easterly point is 500 miles farther east than Porto Rico, and its western boundary has practically the longitude of Buffalo, N. Y.

Since 1912 Quebec has had an area of 706,834 square miles, making it nearly double its former size, 351,873 square miles. It covers an area nearly equal to that of the seven American states farthest west—Washington, Oregon, California, Idaho, Nevada, Arizona and Utah. The entire Dominion of Canada is not much more than five times as large as Quebec. It is the most easterly of the provinces, and through it flows the Saint Lawrence, the great, natural gateway to the interior. Anticosti and a number of other islands belong to the province.

The People. When Canada became a British possession in 1763 there were about 70,000 French in the country. The British government wisely allowed these new subjects to retain their laws, religion, language and social customs; these have been handed down from one generation to another practically without change, so to-day we find in the French portion of Quebec a rare and beautiful picture of the old Norman customs of a past age. This life is at its best in the great, fertile region bordering the Saint Lawrence River and extending eastward from Montreal.

Throughout this region the farms and roads are as regularly laid out as are the blocks and streets of a city. According to the original plan each farm was thirty rods wide and a mile long. The main roads are parallel and two miles apart, with connecting crossroads every two miles. The best roads are macadamized, and in the most densely-populated sections such a road may for miles resemble a village street, since it is bordered on either side with



A TYPICAL FRENCH VILLAGE
Such communities are found throughout the eastern part of the province.

groups of farm buildings. The houses are with few exceptions of wood, with curved roofs and the eaves projecting so as to form a veranda on the front. These homes are usually white, with red roofs, and the barns are kept fresh and clean with whitewash. Every few miles the parish church, with its slender, tin-covered spire, pointing heavenward, towers above its surroundings. Near the church are the post office, the public school and usually one or two stores.

Amid these surroundings dwells a happy and prosperous people. As a rule families are large, and class distinctions based on wealth or position are unknown; but one transgresses the

laws of the Church or the customs of society at his peril. The people are industrious, thrifty and fun-loving. Among them dishonesty, poverty and vice are scarcely known. French is the language of the land, and English is seldom heard except in the larger towns. In the western part of Montreal, and in the region lying between the Richelieu and Saint Lawrence rivers and the New England states, known as the Eastern Townships, the great majority of the inhabitants are of English and Scotch descent. The habits of life and social customs in this region closely resemble those of the Northern New England states. The region was originally settled by people from the English colonies who sided with England in the Revolutionary War. In general, the English people control the great financial enterprises of the province, but in numbers they are only thirteen per cent of the population of the province. The total population of Quebec was 2,361,199 in 1921.

Religion. About six-sevenths of the people are communicants of the Roman Catholic Church. The Protestant denominations in order of their membership are the Anglican (Episcopal), Presbyterian, Methodist and Lutheran.

Surface and Scenery. According to surface, Quebec is naturally divided into three regions —the plateau north of the Saint Lawrence, the long, level plain bordering the river on the south, and the region crossed by the Notre Dame Mountains and comprising the southeastern counties. The plateau north of the Saint Lawrence occupies by far the largest of these regions. On it the Laurentian Mountains rise here and there, but nowhere attain a high altitude. The outcroppings of these mountains form the bold bluffs bordering the river on the north and reaching their greatest height in Cap Tourmente (2,000 feet) below Quebec. A height of land separating the rivers flowing into the Saint Lawrence from those flowing into Hudson Bay crosses this plateau in an irregular line from east to west. That portion of the plateau immediately north of the Ottawa River is a beautiful region of valleys, streams and wooded hills.

The lowland bordering on the Saint Lawrence is nearly level, but it is crossed by a number of isolated peaks extending from north to south and known as the Montenegrin Hills. The region crossed by the Notre Dame Mountains, which are an extension of the Appalachian System, is rolling and hilly and in some places mountainous. The highest peak, Table Top Mountain, has an altitude of 4,000 feet (see map on page 4890).

Rivers and Lakes. Quebec is a land of lakes and rivers. The Saint Lawrence is the great gateway to the interior of the vast continent and the main artery through which most of the rivers of the province find an outlet to the sea. The principal streams flowing into the Saint Lawrence from the north are the Ottawa, forming a part of the southern boundary; the Gatineau, down which millions of feet of timber are floated; the Saint Maurice, noted for its volume of water and falls, and the Saguenay, with its magnificent scenery. On the south is the Richelieu, which drains Lake Champlain, the Chaudière, with its beautiful falls, and the Saint Francis, valuable for its water power.

LOCATION MAP

The illustration shows the size of Quebec in comparison with the other provinces, and the proportion of the Dominion it occupies.

The great region north of the Height of Land is drained into Hudson Bay and the Atlantic Ocean. The Hamilton River is noted for Grand Falls, a cataract which in many respects rivals Niagara. After a series of cascades, covering about twelve miles, the river makes a final plunge of 316 feet. The fall is 200 feet wide, and is slightly higher than the famous Great Falls in Yellowstone National Park. Were Grand Falls easily accessible, it would be visited every summer by large numbers of tourists. Most of the streams flowing into the Saint Lawrence from the north descend the plateau in a series of cascades which add much to the beauty of the region.

The lakes abound in fish and the shores are clothed with forests. Lake Megantic, north of Maine, is a favorite resort for fishermen. Lake Memphremagog, nestling among the hills with its southern end in Vermont, is famous for its scenery and is visited by many tourists every season. Lake Saint John, about 100 miles north of Quebec, is a favorite resort easily reached by rail or by steamer by way of the Saguenay. These are the best known of the many lakes which lend their beauty to the Quebec landscape. All are characterized by their clear water, abundance of fish and charming settings.

Climate. In the southern part of the province and along the Saint Lawrence the summers are warm, with occasional hot days; and the winters are long and cold, with deep snows. Spring is short and autumn is pleasant. The northern part of the province has a cold climate with long, severe winters and short, hot summers. Everywhere the rainfall is ample for agriculture. The atmosphere is clear and crisp, and the entire province has an invigorating and healthful climate.

Plants and Animals. In the valleys of the Saint Lawrence and the Ottawa and in the eastern townships are forests of hard- and soft-wood trees. The oak, the ash, the maple and the spruce and pine are here. The northern wild flowers, the hepatica, the claytonia and the violet, adorn the fields and waysides in the spring, and the aster, goldenrod and other favorites are abundant in late summer and early autumn. Nearly all the vast territory north of the Saint Lawrence is covered with forests of spruce, tamarack and jack pine.

The moose, the caribou, the deer, the bear and the lynx are the valuable large animals; while among the smaller animals are found the otter, the mink, the fox, the weasel, the muskrat, the skunk and the beaver, all valuable for their fur. The hunter and trapper still range the forests, and Quebec's contribution to the world's production of fur is important. Stringent laws have recently been enacted by the Quebec legislature for preventing the extermination of the most valuable fur-bearing animals.

Thousands of waterfowl frequent the lakes to nest in summer, and all the birds found in a northern clime may be seen throughout the southern part of the province, until a drop in temperature warns them of the approach of winter, and they hasten southward. The Canada goose is of especial importance.

Sources of Quebec's Wealth

Minerals and Mines. The mineral resources are only partially developed. Quebec supplies about eighty per cent of the world's output of asbestos, the mines being located in the Eastern Townships, chiefly in Thetford and Danville. The yearly output is valued at $25,000,000. The output of cement amounts to about $6,500,000 and that of marble and limestone to over $1,800,000. Brick are made in a number of localities, and the year's production amounts to about $1,300,000. Some copper is mined in the Eastern Townships, and silver in paying quantities is obtained in the reduction of the ore. Owing to the absence of coal, but little iron is mined. Graphite, minerals valuable for paints, manganese and a number of other minerals exist in paying quantities. The total value of the minerals produced is about $55,000,000 each year

Fisheries. Fishing is an important occupation for the people dwelling along the shores of the Gulf of Saint Lawrence. The total annual value of the fisheries is nearly $2,600,000. Cod, herring and salmon, in the order named, yield the largest revenue. Lobsters and mackerel are also taken in large numbers. The inland fisheries are of small commercial value. The entire industry gives employment to about 10,000 men.

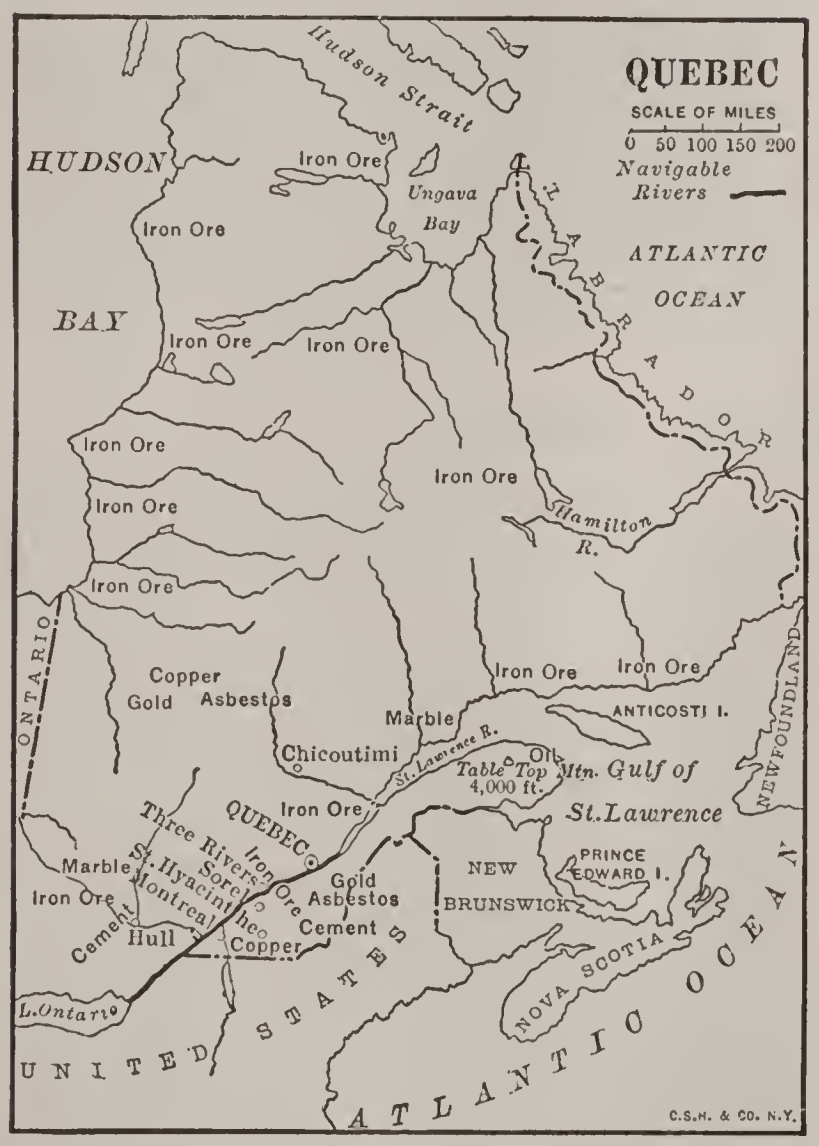
Forests and Lumber. The forest area of Quebec is not fully known, as the great forests of Ungava have not been surveyed. Exclusive of this unsurveyed portion there are over 130,000,000 acres of forest still standing. Of this total area, 5,000,000 acres are private property and 45,000,000 are under license to lumbermen. The trees include white pine, spruce, balsam, hemlock, red pine, cedar and tamarack among the soft woods, and oak, beech, birch and maple among the hard woods. Lumbering is one of the leading industries of the province and is carried on chiefly around the sources of the Ottawa, the Gatineau, the Saint Maurice and a few other streams north of the Saint Lawrence. The logs are cut in the winter and floated down the streams to the mills in the spring when the water is high. Large lumber mills are found on all these rivers; but some of the timber is made into rafts that are towed long distances by steamers. Spruce is cut in the largest quantities, since it is the most desirable wood for the manufacture of pulp (see PAPER). The other cuts, in the order of importance, are white pine, hemlock and balsam fir. Lumber of all dimensions, shingle and lath are manufactured in large quantities. The total yearly output amounts to about $50,000,000.

Both the Dominion and the provincial governments exercise close supervision of the forests, and the cutting of timber on all licensed lands is so restricted as to prevent destruction of the forests.

Forest Reserves. The following forest reserves are located in the province: Saguenay

and Labrador Reserve, 110,000 square miles; Ottawa Reserve, 27,712 square miles; Saint Maurice Reserve, 21,141 square miles; Laurentide National Park, 3,271 square miles; Rimouski Reserve, 2,500 square miles; Peribonka Park, 3,500 square miles, and a number of small parks and reserves. The total area of these reserves is 174,000 square miles.

Agriculture. Agriculture is the leading occupation, and over one-half the occupied land is under cultivation. This, however, is but a small part of the tillable land in the province. The region south of the Saint Lawrence is highly



OUTLINE MAP OF QUEBEC

Showing the boundaries, chief rivers, principal cities, iron ore and other mineral deposits, and the highest point of land in the province.

fertile with the exception of small areas on the mountains, and the land is all occupied. The region north of the Ottawa and the island of Montreal are also excellent for agriculture and are being rapidly developed. There are large areas of fertile land on the plateau north of the Saint Lawrence, but these areas are separated by tracts of rocky land unsuited to tillage. The soil and climate of the Eastern Townships are especially suited to raising live stock, and dairy husbandry is the chief agricultural occupation in that locality. Large quantities of butter and cheese are made in the valley of the Saint Lawrence, the total output for the province amounting to over $37,000,000 a year. Cattle, horses, sheep and swine are raised throughout the province, and within recent years the breeds of all these animals have been greatly improved.

Hay and clover, oats, potatoes, buckwheat, barley, spring wheat, fodder, corn, in the order named, are the most important crops. Rye and other grains are raised, and corn is grown in some localities. Large quantities of apples are raised in the Eastern Townships and on the island of Montreal. Plums, pears and small fruits are successful in the southern part of the province. About 4,000,000 pounds of tobacco are grown each year, the industry being confined to the country immediately around Montreal. Because of the short season only early varieties are successful.

The production of poultry and eggs has become important, and the possibilities of the industry are such that the government is lending its assistance by educating the school children in poultry raising, encouraging the formation of boys' and girls' poultry clubs, and sending poultry experts as demonstrators to all parts of the province.

The provincial department of agriculture is effective in developing the resources of the province. Agricultural education is making rapid strides. Besides the regular agricultural colleges with their full courses of study, short courses are given in different localities, and many farmers' institutes are held and numerous experiments are carried on by agricultural associations. With rare exceptions, the Quebec farmer is in prosperous circumstances and earns a good income.

Manufactures. Quebec ranks next to Ontario in the value and variety of its manufactures. Almost every stream is a source of water power, and sawmills, gristmills and small factories of various sorts are widely distributed over the older parts of the province. On the Saint Maurice, the Gatineau and other large streams are extensive plants for the manufacture of lumber and the development of electric power. The leading leather and boot-and-shoe factories are located at Montreal, Quebec and Saint Hyacinthe. There are ironworks at Montreal, Three Rivers and Sherbrooke. The leading factories for making cotton and woolen goods are at Montreal, Valleyfield, Saint Hyacinthe and Sherbrooke. Numerous pulp mills are located in the forest regions north of Quebec. The annual value of the manufactures is about $850,000,000, and the capital invested is somewhat in excess of that amount.

RESEARCH QUESTIONS ON QUEBEC

(An Outline suitable for Quebec will be found with the article "Province.")

How does the highest altitude in Quebec compare with that in Ontario? In British Columbia? In Saskatchewan? In New York?

Why cannot definite statistics as to the forest area of this province be given?

If Texas had a forest area as large as the known forest area of Quebec, how many square miles of its surface would be unforested?

Why have voters a better chance to choose a good man to represent them in the legislature than have the voters of Illinois or New York?

What is the largest surface region of Quebec? What is the outstanding physical feature of this region?

How many of the fifty largest cities of Canada are in Quebec? (See table under article CITY, page 1394.)

What proportion of the total area of Canada does this province comprise? How does the next largest province compare with it in area?

With what countries does Quebec carry on most of its foreign trade? Which are more valuable, the imports or the exports? How much?

How large a percentage of the inhabitants of the province speak English as their native tongue?

Where did the original inhabitants of the Eastern Townships come from?

Of what important mineral substance does the whole world outside of Quebec produce only about one-fourth as much as is produced in that province?

Why is very little iron mined?

Since Quebec has little coal, how do you account for the development of its manufactures?

Describe the farming region in the valley of the Saint Lawrence, stretching eastward from Montreal.

Name seven animals of this province which are important for their fur. Name four others in which the hunter is interested.

What, in general, is the economic condition of the Quebec farmer? How has the province helped in this?

How do you account for the fact that the French language spoken in Quebec has not lost its purity of form?

How many French-speaking people were there in Canada when it came into the possession of England?

How many are there to-day in this one province?

What is the school system doing to develop the poultry business?

What was the official name of Quebec from 1791 to 1867?

What good effect did the War of 1812 have on affairs in Canada?

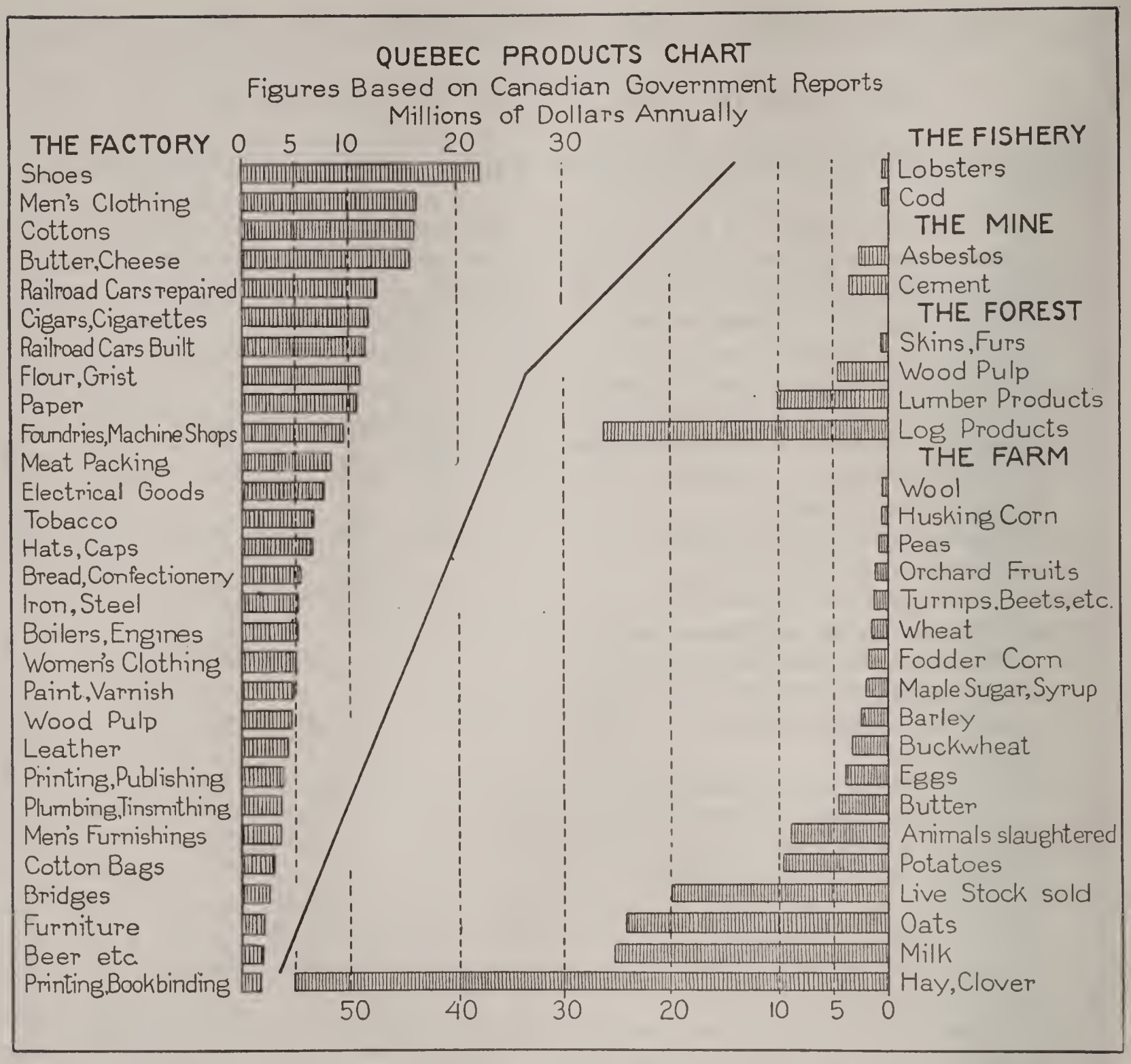
What lake is partly in this province and partly in one of the New England states?

How did the British, when they came into possession of Canada, secure the good will of the French population?

How does the density of population of Quebec compare with that of the Dominion as a whole? With that of Ontario? With that of Montana?

Where is there a waterfall which is considerably higher than Niagara? Why is it not as famous a tourist resort as Niagara?

What is the area of the largest forest reserve in the province? What is the total area of the forest reserves?



Transportation and Commerce. The Saint Lawrence River is navigable for ocean-going vessels as far as Montreal and is the great commercial highway of the province. The Richelieu is obstructed by rapids at Chambly, but a canal at that point makes the river navigable for its entire length for boats of light draught. The Grand Trunk, the Canadian Pacific and the Intercolonial railways with their branches furnish ample railway accommodation to the region south of the Saint Lawrence and along the northern shore of that river. Branches of these lines are being extended northward as fast as the development of the new country seems to warrant. Telegraph and telephone lines are common throughout the settled portions of the country, and spreading rapidly as new regions are opened up.

Montreal and Quebec are the leading commercial centers, and from the port of Montreal large quantities of wheat, grown in the northwest provinces, are shipped to Europe. The leading exports are lumber, wood pulp, butter and cheese, beef and fruit. Most of the foreign trade is with Great Britain and the United States. The imports consist almost wholly of manufactured products, such as clothing, textiles, machinery and hardware. The yearly exports amount to about $148,000,000 and the imports to about $187,000,000.

Government and History

Government. The chief executive is a lieutenant-governor, appointed by the Dominion government. He is assisted by a council of nine members, who are responsible to the legislative assembly. The head of the council, or premier, is the executive head of the government. The legislature consists of two houses, a council of twenty-four members nominated by

the Crown and an elective assembly of eighty-two members. Members are not required to be residents of the district which they are chosen to represent, and this plan gives the voters better opportunity to choose the best men. Quebec has sixty-five members in the Dominion House of Commons, and the number from each of the other provinces is regulated by this number, which was originally assigned to Quebec with the provision that it should remain unchanged (see CANADA, subtitle *The Dominion Government*).

For purposes of local government the province is divided into counties, townships and municipalities, each having its special officers.

The courts consist of the court of the king's bench, or appeals, the superior court and district courts. Judges of the king's bench and superior court are appointed by the governor-general in council. Police courts and courts of the justice of the peace have jurisdiction over small cases in townships and villages.

Education. The public schools are under the control of a superintendent of public instruction, who is assisted by a council of thirty-five members. This council is divided into two committees, one having the management of the Roman Catholic schools and the other that of the Protestant schools. The main support of the schools is local taxation. Owners of property pay their taxes into the Roman Catholic or Protestant or neutral panels respectively. Public companies pay into the latter panel, which is divided between the other two on the basis of population. There are also government grants, divided on the same basis. Each school municipality is in the immediate care of its local board. The educational institutions are divided into three classes: (1) primary schools, which include elementary, model or intermediate schools and academic or high schools; (2) classical colleges; (3) technical schools, such as schools of agriculture, schools of mines and schools of art. The two leading universities, McGill at the head of the Protestant schools, and Laval at the head of the Catholic schools, are described under their respective titles.

History. Until the conquest of Canada by Great Britain, 1759-1763, the history of Quebec was the history of New France. For a detailed account of this period see CANADA, subtitle *History of Canada.*

By the Treaty of Paris in 1763 all of Canada was ceded to Great Britain, and a radical change of administration followed. The British government secured the good will of their new French subjects by leaving the laws and institutions under which they had lived undisturbed and by allowing the free use of the French language in the government and in education. At the breaking out of the Revolutionary War, emissaries from the American colonies tried to induce the Canadians to join with them in the struggle for an independent government, but without success. An expedition against Quebec under Montgomery and Arnold in 1775 was defeated and Montgomery was slain. Another against Montreal failed. At the close of the war a large number of English and Scotch settlers entered the country from the United States, the original settlers of the Eastern Townships being among them.

In 1791 the English settlers in the western part of Canada petitioned for a separate government, and the provinces of Upper Canada (Ontario) and Lower Canada (Quebec) were organized. In 1812 there was a growing antagonism between the English and French elements of the population, but the War of 1812-1814 between England and the United States served to unite these nationalities in support of the British government. For twenty years following the close of this war, government conditions in Canada were not satisfactory, and this led some of the French in Quebec to join in the Rebellion of 1837. This was headed in Upper Canada by William Mackenzie and in Lower Canada by Louis Papineau, who declared the purpose of the uprising to be the establishing of an independent Canadian nation. At this time the population of Lower Canada was about 300,000, three-fourths of whom were French. In 1841 the provinces were united under one government and a Canadian Parliament of two houses was established, and this arrangement continued until the formation of the Confederation in 1867, when Quebec became a province of the Dominion of Canada.

Since Quebec became a member of the Dominion its record has been one of progress and prosperity. The energies of the government have been devoted to the development of the natural resources of the province, the advancement of education and the conservation of the political rights of the people in the Dominion government. During the century and a half of their existence under British rule the French Canadians have been insistent upon retaining their native language and all social customs.

There is a provincial organization for maintaining the purity of the French language. In December, 1917, Quebec protested against conscription for the war, and offered to withdraw from the Dominion. J.A.D.

Consult Hopkins' *French Canada;* Willson's *Quebec, the Laurentian Province.*

Related Subjects. The reader who is interested in Quebec will find much information in the following articles in these volumes:

CITIES AND TOWNS

Aylmer
Black Lake
Buckingham
Chicoutimi
Coaticook
Drummondville
Farnham
Fraserville
Granby
Grand' Mère
Hull
Joliette
Lachine
Laprairie
La Tuque
Lauzon
Lévis
Longueuil
Magog
Maisonneuve
Megantic
Montmagny
Montreal
Nicolet
Outremont
Quebec
Saint Hyacinthe
Saint Johns
Shawenegan Falls
Sherbrooke
Sorel
Thetford Mines
Three Rivers
Valleyfield
Verdun
Victoriaville

LEADING PRODUCTS AND INDUSTRIES

Apple
Asbestos
Butter
Cement
Cheese
Cod
Dairying
Fish
Hay
Herring
Lumber
Oats
Spruce
Tobacco

WATERS

Chaudière
Hamilton River
Memphremagog
Ottawa
Saguenay
Saint Lawrence

UNCLASSIFIED

Anticosti
Appalachian Mountains
Laurentian Plateau
Quebec Act
Quebec Resolutions
Quebec Ter-Centenary

QUEBEC, *kwe bek'*, called "the Cradle of New France" and "the Gibraltar of America," is the only walled city in North America. It is the oldest city of Canada and the capital of the province of Quebec, and is situated on Cape Diamond, a bold promontory formed by the confluence of the Saint Lawrence and the Saint Charles rivers. It is 780 miles southwest of the Strait of Belle Isle and 164 miles northeast of Montreal. When Jacques Cartier (which see) sailed up the Saint Lawrence in 1535, the Indian town of Stadacona clustered about the foot of the bluff, which rises precipitously to a height of 333 feet. Cartier erected a cross and took possession of the country for France. The city was founded in 1608 by Samuel de Champlain (which see), who began a small settlement at the foot of the cliff. The three-hundredth anniversary of this event was celebrated in 1908.

Until Canada became a British possession in 1763, Quebec was the seat of government for New France and the chief center of French influence in America. The little settlement expanded with the growth of the fur trade and other interests. Champlain transferred his residence to the top of the bluff and other residences followed. This was the beginning of the divisions of the city, which soon became known as Lower Town and Upper Town, a distinction which they have retained to the present day.

Quebec is an important shipping port and railway center. The largest ocean-going ships come to its wharf, where they meet river boats and exchange cargoes. The city is served by the Grand Trunk, the Canadian Pacific, the Intercolonial and a number of shorter railway lines. Several miles above Quebec a railway bridge across the Saint Lawrence has for several years been in the process of construction.

When completed it will have the greatest single span of any bridge in the world, but the work has been delayed by unforeseen accidents. Twice portions of the bridge have collapsed, the first accident occurring in 1907 and the second in 1916 (see BRIDGE, and illustration on page 922).

Interesting Features. Quebec is one of the most peculiar and interesting cities on the American continent. The older part of the city is built along the foot of the cliff on a narrow strip of rocky ground. Many of the old buildings with their walls of cobble stones and mortar and their unique roofs with dormer windows still remain. In some sections the roofs are connected by walks so that the inhabitants may go from house to house on the roofs instead of in the streets, many of which are too narrow to admit of sidewalks. Great piers extend for three miles along the river, and these are lined with shipping during the season of navigation. The customhouse and wholesale establishments are located along the wharf, making the Lower Town the chief business center.

About halfway up the bluff a massive wall, partially surrounding the Upper Town, was built. Five gates provided entrance to the enclosed portion of the city, but these with portions of the wall have been removed. Two, the Saint Louis and the Kent, were restored under the direction of Lord Dufferin, when he was Governor-General of Canada, but the architecture of the new gates is modern and in sharp contrast to the original walls. Higher up on the top of the bluff the citadel was built. The present structure, begun in 1823, is the third that has been built on the same site, and is no longer of any value as a means of defense, although it is occupied by a regiment of Canadian troops. The fortifications upon which the city depends are on the heights of Lévis on the south bank of the river. Extending back from the citadel is a rolling plateau, over a part of which surged the forces of Wolfe and Montcalm, in the memorable battle of 1759. A monument marks the spot where Wolfe fell. See QUEBEC, BATTLE OF.

A driveway along the foot of the bluff takes one past the spot where Montgomery fell in his disastrous attempt to capture the city in 1775, and past the devious path up which Wolfe's soldiers made their famous ascent. Many visitors climb the path without finding the task as arduous as it has been described in many accounts of the historic achievement.

Research Questions on the City of Quebec

(An Outline suitable for Quebec will be found with the article "City.")

Name six heroes of the early period of Canadian history whose statues or monuments adorn the grounds of the provincial parliament buildings.

What part did each of these men play in Canadian history?

What distinction has Quebec in point of age?

Who founded the city? How did the distinction between the Lower Town and the Upper Town begin?

Where is the inscription that reads

Valor gave them a common death,
History a common fame
And posterity a common monument,

and to whom does it refer?

How did the region of Quebec come into the possession of France, and how long did it remain French territory? How did the English gain possession of it?

How many cities in Canada are larger than Quebec? (See list under article CITY.) How many in the province of Quebec?

What distinction in point of size has the bridge which is being built across the Saint Lawrence above Quebec?

Why are there walks across the roofs in certain sections of the city?

Where are the fortifications which entitle Quebec to rank as the "Gibraltar of America?"

Where is the greatest French hero of the early period buried? Where, according to tradition, is the founder of the city buried?

How does Quebec differ in point of structure from any other city on the continent?

Who, so far as is known, was the first white man to visit the site of the city?

Why do the gates in the old wall not "match" the wall?

How many citadels have occupied the site at the top of the bluff?

What great event in the history of the city took place in 1759? In 1763? In 1775?

Where may you pass from one part of a city to another by means of stairways?

What church is named for a battle, and when was the battle fought?

To whom is the university which is "at the head of French culture in the New World" a monument?

What was the Quebec Ter-Centenary? How was it celebrated?

The older streets are narrow and some of them are crooked. Those leading from the Lower to the Upper Town are steep and winding. In numerous places stairways lead up and down the slope and save time and distance. In the Upper Town the streets resemble more closely those of a modern city, and the main thoroughfares throughout the city are frequented by the electric car and the automobile. In all the older parts of the city buildings, shrines and monuments of the past intermingle with modern structures, methods and devices, but the most interesting feature of it all is the overshadowing influence of a past age whose grasp the progress of the present has not been able to weaken. Serene in the possession of a unique and potent past, Quebec is the most interesting and striking example of a medieval French city.

Buildings, Monuments and Parks. The best residences and the most important public buildings, together with the promenades and public gardens, are in the Upper Town. The buildings of the provincial parliament and departments of the government are the most important public structures. The grounds are adorned with monuments and statues reared to the memory of the heroes of a former age—Cartier, Frontenac, Laval, Maisonneuve, Wolfe, Montcalm and Levis. The post office, courthouse, customhouse and city hall are all imposing and stable structures, and well worth visiting. The Roman Catholic Cathedral contains several paintings by eminent artists, but in the Older Basilica and the adjoining seminary one may see a collection of great merit. The Anglican Cathedral and the Jewish Synagogue are fine structures, as is the Church of Notre Dame des Victories, so named because of the victory over Sir William Phipps in 1690. Laval University has a number of interesting buildings, the oldest dating from 1666. This institution and the Seminary of Quebec are at the head of French culture in the New World. The university has a number of excellent libraries and a valuable museum. In the chapel of the Ursulines is the tomb of Montcalm, and probably (for no one can positively affirm the fact) the remains of Champlain lie buried in the Basilica. Seven miles below the city are Montmorenci Falls, a beautiful cascade 250 feet high.

The most attractive spot in the city and the one place frequented alike by visitors and inhabitants is Dufferin Terrace, a promenade 1,400 feet long and about 200 feet above the river. Directly back of it is the Government Garden, beautiful in lawns and flowers. Here is a monument erected by the inhabitants to the memory of Wolfe and Montcalm and bearing this inscription in Latin:

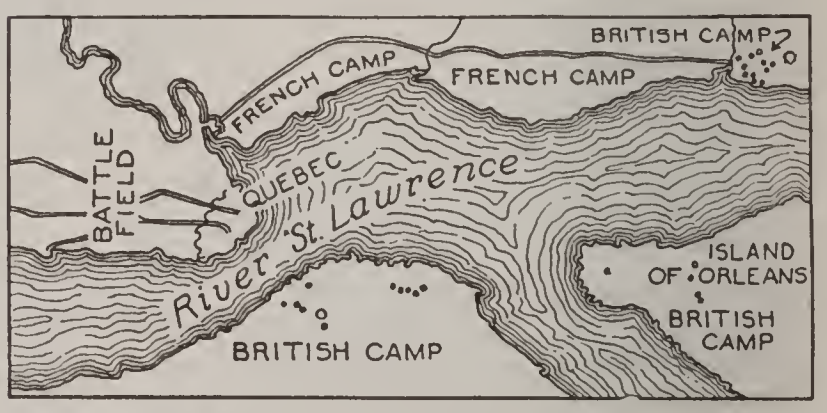
> Valor gave them a common death,
> History a common fame
> And posterity a common monument.

East of the Terrace is the picturesque Chateau Frontenac, one of the most complete modern hotels in America. At one's feet lies the Lower Town, and beyond the great river flows majestically to the sea. Above and back of the Terrace rises the citadel from whose parapets a still broader view, including the island of Orleans, the town of Levis across the river and the blue summits of the Notre Dame Mountains may be obtained. The population in 1921 was 95,193. See QUEBEC TER-CENTENARY.

J.A.D.

Consult Parker's *Quebec, the Place and the People;* Dionne's *Quebec Under Two Flags.*

QUEBEC, BATTLE OF, the battle that determined the destiny of a continent, fought between the French and the English on the Plains of Abraham, adjoining the city of Quebec, September 13, 1759. This battle was the turning point in the long struggle of the French and English for the possession of North America. In 1759 William Pitt, Prime Minister of Great Britain, resolved to complete the conquest of the French in America and bring the French and Indian Wars to an end (see FRENCH AND INDIAN WARS). He planned two campaigns. One, under General Amherst, was to invade Canada by way of Lake Champlain and capture Fort Ticonderoga and Montreal; the other, under General Wolfe, was to sail up the Saint Lawrence River and capture Quebec.



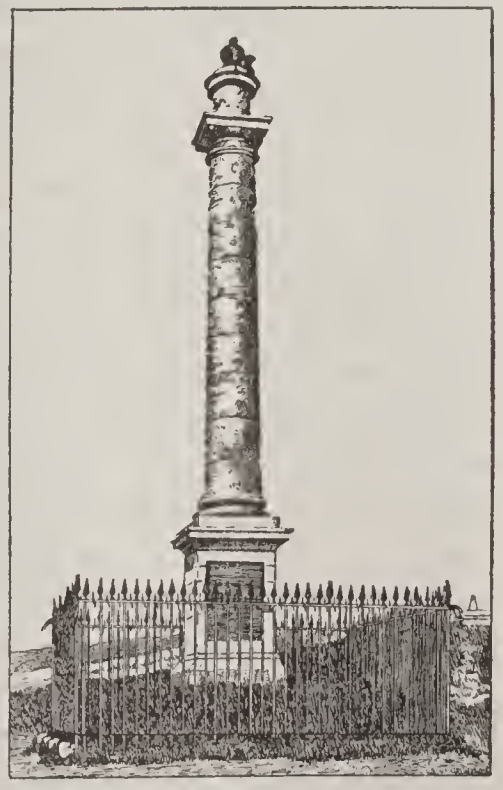
MAP OF BATTLE FIELD

Early in June, Wolfe with a trained army of 9,000 men appeared before Quebec and began a siege of the city which the French considered could not be taken by assault, since the high, steep promontory upon which the fortress was built made the fort inaccessible from the river, while the guns of the fort could sink any

ship that attempted to pass them. For several miles on either side of the promontory on which Quebec is built, the north bank of the Saint Lawrence is high and steep. Along these heights the French forces under the command of Montcalm were stationed. Wolfe landed his army on the island of Orleans four miles below the city. He then sent a detachment to Point Levis on the south bank of the river directly opposite the citadel. From these two points the British bombarded the city with such success that the inhabitants were compelled to abandon their homes, and many buildings were destroyed.

On July 31 the British made an attack on Beauport, near Montmorenci, which resulted in failure, but a detachment of the British forces encamped on the opposite side of the Montmorenci where they remained until they were withdrawn for the final attack upon the city. Wolfe now conceived one of the most daring projects in military history. He would scale the heights in the night and attack Montcalm in the rear. The plan was desperate. If it succeeded Quebec would be won; if it failed the British army would be destroyed.

The most careful preparations were made. The time chosen was when there was no moon, and the bed of a little brook (then dry) was selected as the pathway up the ascent. On the night of September 12, the British forces rowed to the designated point with muffled oars and began the ascent in single file. Before daybreak between 4,000 and 5,000 of the best troops in the British army were in battle array on the Plains of Abraham. The French were amazed, but Montcalm brought his forces to the attack in good order. The British officers, however, had commanded their men to reserve their fire until the enemy was within forty paces, and the first volley piled the ground with heaps of slain. The French line broke and fled, and all the efforts of their officers to rally them for a second attack were in vain. The battle was short, but Quebec was won. Both commanders lost their lives, but within a few days the city surrendered to General Townsend, the British commander who succeeded General Wolfe.



BATTLE MONUMENT
On the Plains of Abraham.

With the fall of Quebec, the French lost all hope of retaining their American possessions, and at the Treaty of Paris, 1763, all of Canada was ceded to Great Britain. The Battle of Quebec, therefore, was one of the most important military events in American history. At the celebration of the Ter-Centenary of the founding of Quebec in 1908, this battle field and the battle ground of Saint Foy were made into a national park and given the name *Battlefields National Park*. See MONTCALM, LOUIS JOSEPH, MARQUIS DE; WOLFE, JAMES. W.F.R.

QUEBEC ACT, an act passed by the British Parliament in 1774 for the purpose of organizing the government of Canada, which had been acquired from France in 1763, at the close of the French and Indian Wars. For ten years affairs in the new possession were in a troubled state. The "new subjects," as the French-Canadians were called, desired to continue their "ancient customs and usages," particularly in the administration of justice. They were accustomed to trial by a judge without a jury and to other features which the "old subjects," the English colonists, did not like. General discontent made a definite arrangement necessary, and in 1774 Parliament organized the province of Quebec.

The Quebec Act included three provisions which caused great indignation among the English-speaking colonists. First, the province of Quebec was extended to include all of the territory north of the Ohio River and east of the Mississippi, a section which the colonies on the Atlantic coast claimed by their original charters. Second, in this territory the act substituted French for English civil law. Third, the act withheld the privileges of representative government from the inhabitants.

The Quebec Act was justified in the eyes of its supporters by the arguments that most of the settlers in the Northwest Territory were French, and that they were not acquainted with and did not want English law and institutions. The English colonists, however, regarded the act as a blow at them and their desire for expansion. For this reason the Quebec Act was one of the chief factors in stirring them to revolt. Even in England there was considerable resentment, and charges were publicly made that the interest of the English Protes-

tant colonists were being sacrificed to those of the French Catholics. Parliament's desire to conciliate the French-Canadians was rewarded only a year later, when Quebec refused to join the English-speaking colonies in their revolt against the mother country.

Consult Hart's *The Quebec Act, 1774.*

QUEBEC BRIDGE. The longest bridge span ever designed is that in the great cantilever structure over the Saint Lawrence River at Quebec. Its two railroad tracks and two broad footways have no support from beneath for a distance of 1,800 feet, nearly twice the length of the longest steamship in the world. The only bridges ever built whose spans are even approximately this length are the Forth Cantilever Bridge in Scotland and the Williamsburgh Suspension Bridge at New York. The former has two gaps of 1,710 feet between supports, and the Williamsburgh Suspension Bridge is swung from towers 1,600 feet apart.

No other great engineering undertaking of modern times has met with such misfortune as the erection of the bridge at Quebec. In 1907, when nearly completed, it suddenly collapsed. The Canadian government then bought the rights of the owners, and commenced its reconstruction in 1911. On September 11, 1916, as the central span, weighing 5,000 tons, was being lifted into place, one corner of it slipped from its supports and the span sank in 200 feet of water. The cause of the first accident is explained in the description of cantilever structures in the article BRIDGE, where a drawing made from the engineer's plans will also be found (see page 922). The span was finally completed, October, 1917.

The total length of the Quebec Bridge is 3,228 feet, and its under side is 150 feet above the water, high enough to permit the passage of the tallest ship that will enter the river. The railroad tracks which it carries will serve the National Transcontinental Railway and the trunk lines to the United States.

QUEBEC RESOLUTIONS, the document which cleared the way for Confederation in Canada. In October, 1864, representatives from the various provinces met in Quebec, and under the leadership of Sir John A. Macdonald drew up a set of resolutions embodying the conditions on which federal union would be accepted. These resolutions were adopted by the legislatures and presented to the queen in the form of a series of addresses; and on them was based the British North America Act, which established the Dominion of Canada. See BRITISH NORTH AMERICA ACT.

QUEBEC TER-CENTENARY, *sen'te na ri.* The city of Quebec was founded by Samuel de Champlain in 1608. Fittingly to observe the three-hundredth anniversary of the event the people of Quebec began, in 1905, to plan a celebration. The Dominion government entered heartily into the arrangements, and representatives of the great nations were invited to participate.

A facsimile of the vessel in which Champlain sailed to America was built, and on July 23, 1908, appointed as "Champlain Day," it sailed to a designated landing place. This event marked the official opening of the Ter-Centenary. During the following days the old battle fields were dedicated as a national park, in which ceremony 30,000 Canadian troops and warships of Great Britain, the United States, France, Germany, Italy, Spain, Japan and Argentina participated. Pageants, continuing two weeks, celebrated nearly every striking event in Canadian history.

The Vice-President of the United States, Charles Warren Fairbanks, was the official representative of that country. The Prince of Wales, now King George V, represented the mother country.

QUEEN, the title given to a woman who is the sovereign ruler of a state. Her official designation is *queen regnant.* The wife of a king is, by courtesy, addressed as queen, but her legal position is that of *queen consort.* The mother of a king is a *queen mother,* and the widow of a king is a *queen dowager.* The present form of the word is derived from the Old English *cwene.*

A queen regnant has every political right, duty and obligation of a male sovereign. The queen consort is a subject of the king, but has certain privileges not accorded other women of royal birth. In most countries under monarchical rule her rights and liabilities and general political and legal status are the same as those of a woman who has no husband. Financial provision is made for her by law. The queen dowager has practically the same standing, privileges and support as the queen consort, except that it is not high treason to conspire to put her to death, as is true of an attempt upon the life of a queen consort, because the succession to the throne is not endangered thereby. Such a crime is simply murder, as in cases affecting persons of less exalted stations.

QUEEN ANNE'S WAR. See FRENCH AND INDIAN WARS.

QUEEN CHARLOTTE, *shahr'lot,* **ISLANDS,** a small group of islands lying off the coast of British Columbia and for governmental purposes a part of the province. Geologically, however, like Vancouver Island, 130 miles to the southeast, they are the remnants of an extinct mountain range which belonged to a different era from the mainland. Except on Graham Island, which is chiefly a rolling plain, the surface is mountainous in character, though it nowhere reaches an altitude of more than 5,000 or 5,500 feet. There are many excellent harbors, and coal deposits of good quality, besides abundant timber and some minerals. Halibut fishing in Hecate Strait, which separates the islands from the mainland, is a large industry, but is conducted chiefly from the mainland. The area of the group is about 5,100 square miles.

The inhabitants of Queen Charlotte Islands, except for a few white settlers, are the survivors of the Haida tribe of Indians, now no more than 700 in number. This was the finest and most advanced of the Pacific coast tribes. It had developed to its highest degree the conventional art of the Indians, and its carved totem poles are considered the most remarkable on the Pacific coast (see TOTEM). The islands were discovered by Captain Cook, about 1770, and were named by Captain Dixon, who visited them in 1787 in his ship, the *Queen Charlotte,* and claimed sovereignty for Great Britain. W.B.

QUEENSBERRY, *kweenz'bur i,* JOHN SHOLTO DOUGLAS, Marquis of (1844-1900), a widely known English patron of sport, especially of pugilism. He was but fourteen years of age when he succeeded to the title of marquis. The next year he joined the army, where he remained for five years, and from 1872 to 1880 represented Scotland in Parliament. Because of his interest in the sport, the new rules for prize fighting which he helped to formulate in 1867 were called the Queensberry Rules, and these are yet the leading authority.

QUEENSLAND, *kweenz'land,* the second largest state of the Australian Commonwealth, ranking next to Western Australia. It occupies the entire northeastern part of the continent. Having an area of 670,500 square miles, it is nearly one-fifth as large as the United States and about three times the size of Manitoba, Canada. A wedge-shaped peninsula extends northward, enclosing the Gulf of Carpentaria, and the state has over 3,000 miles of seacoast. (See map of Australia, following page 488.) The Great Barrier Reef, a coral ridge off the east seacoast, extending for a distance of over 1,200 miles, encloses a broad, quiet bay, dotted with numerous islands and forming many fine harbors (see BARRIER REEF).

LOCATION MAP
Showing position of Queensland in the Commonwealth and the proportion of the continent occupied by it.

For about 300 miles inland, the eastern section is rugged and mountainous, some of the wooded peaks rising more than 5,000 feet above the sea. The western section is a treeless, grass-covered plain, broken by a spur of mountains and underlaid by extensive coal beds. Queensland has more rivers than any of the other Australian states. Mangrove thickets and luxuriant forests border these streams, which on the Pacific coast are navigable for many miles.

The climate is equable, and even in the arid sections the temperature rarely rises above 95° F. The rainfall is abundant on the east coast, averaging 150 inches in the north. It decreases to twenty inches in the interior and averages but six inches a year in the extreme west.

The People. In 1911 the inhabitants numbered 605,813, about one-fifth of whom were from the British Isles. In 1915 the population was estimated to be 689,678. Nearly one-fourth of the inhabitants are full-blood or half-caste Asiatics, Polynesians and aborigines. The capital and largest city is Brisbane, on the east coast (see BRISBANE).

There is no State Church, but over one-third of the inhabitants are members of the Church of England. The Roman Catholics constitute the next largest religious body, followed by the Presbyterian, Methodist and Lutheran denominations.

Primary education is free and compulsory, and the percentage of illiteracy is low. There are separate secondary schools for girls and boys, sixteen technical schools, a university at Brisbane and many private institutions. Charitable institutions, including hospitals, asylums and homes, are supported by a state endowment and public subscription.

Industries. In the eastern section, large crops of hay, wheat, maize, potatoes and many varieties of fruit, including bananas, pineapples and oranges, are grown. Sugar cane, however, is the most important commercial crop. Large flocks and herds are pastured in the arid, western plains, and dairying is important in the south. Queensland produces nearly one-half of the cattle of the Commonwealth.

The mountains are rich in gold, silver, tin, copper and bismuth, and the state promises to become important in the production of coal. Flour, sugar, and malt and distilled liquors are important articles of manufacture, and the meat-packing, tanning and timber industries are prosperous. There are large exports of gold, wool, meat, sugar and hides; textiles, clothing and metal goods are imported.

Government and History. The chief executive officer is a governor appointed by the British government, who is assisted by an executive council of nine members. The legislative department consists of a Parliament made up of the legislative council of forty-five members, appointed by the Crown for life, and the legislative assembly of seventy-two members, elected for three years. Most of the railroads, which have a mileage of about 5,000, are controlled by the state (see map on page 489). Woman suffrage prevails in Queensland, as in the other Australian states. The first settlement was a penal colony, established in 1826 on Moreton Bay. The immigration of criminals was stopped in 1839, and three years later the colony was opened to settlers. In 1859, Queensland, which had been a part of New South Wales, was made a separate colony, and in 1899 it became a member of the Australian Commonwealth (see AUSTRALIA, subhead *History*). E.B.P.

Consult Russell's *The Genesis of Queensland;* Bicknell's *Travel and Adventure in Northern Queensland.*

QUEENS'TON HEIGHTS, BATTLE OF, one of the minor military engagements in the War of 1812, but important because it ended the first attempt of the Americans to invade Canada. The British commander, General Brock, after taking Detroit in August, 1812, turned his attention to the defense of the Niagara frontier. Brock had about 1,500 men, scattered along a line thirty-six miles long; the Americans, commanded by Generals Van Rensselaer and Smyth, numbered over 6,000. Early on the morning of October 13, 1812, the Americans began to cross the Niagara River from a point opposite Queenston Heights, seven miles below the Falls. About 400 of the Americans, who had succeeded in making a landing, were at once attacked by a force led by Brock himself, who was among the first to fall, mortally wounded. The landing party retained possession of the heights, but later in the day, after both sides had received strong reënforcements, the British completely surprised the enemy, who lost about 900 prisoners and were compelled to withdraw. The victory was clouded by the death of Brock, who was one of the ablest and most gallant of the officers in either army. A monument to his memory, erected in 1824 by the province of Ontario, stands on the battle field (for illustration, see BROCK, SIR ISAAC).

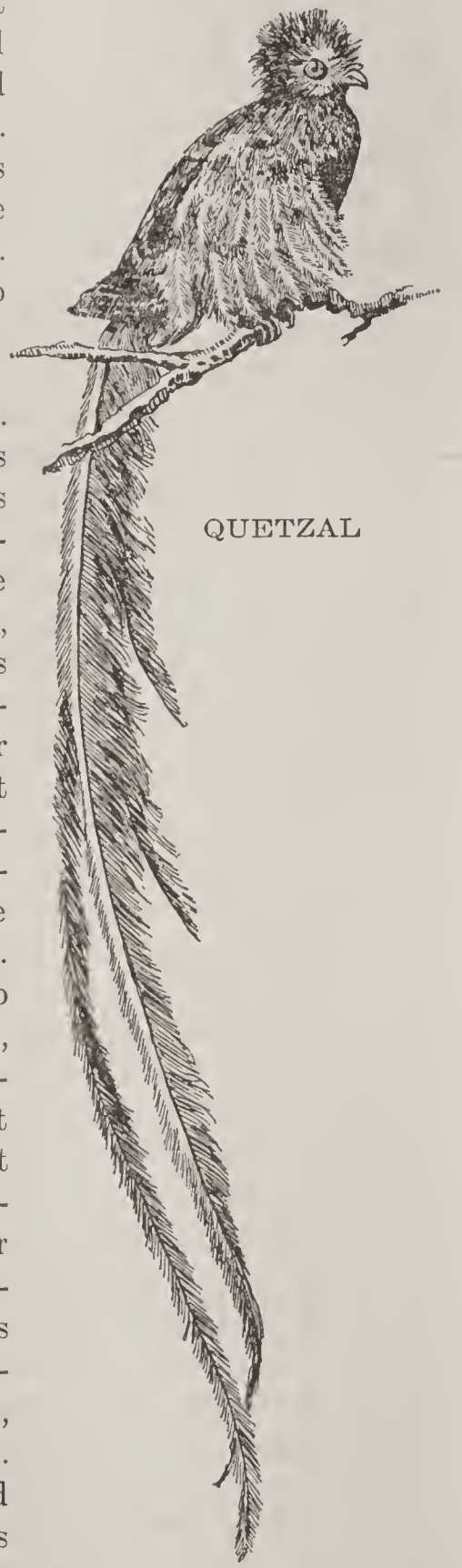
QUEENS'TOWN, formerly COVE OF CORK, a seaport of Ireland, on the south side of Great Island. The town is built in a semicircle facing Cork Harbor, and the streets rise one above the other like the rows of seats in an amphitheater. Queenstown is not important industrially; it is chiefly a winter resort and an admiralty station. Originally it was merely a fishing village, but during the Napoleonic wars it was made the port of embarkation for soldiers, and is now a port of call for American mail steamers. Features of special interest are the large navy yards, protected by three forts, a government emigration station, and the famous Royal Cork Yacht Club. Population in 1911, 7,864.

QUEEN'S UNIVERSITY, an institution of higher learning at Kingston, Ont., a pioneer in the field of coeducation in Canada. It was founded in 1841 as Queen's College, and has been from the first under the control of the Presbyterian Church. The Presbyterian influence, however, is little more than nominal, and denominational tests are not exacted. The original endowment came in part from the Presbyterian Church of Scotland, in part from the Canadian government and in part from public subscription, but later funds came almost entirely through the last-named channel. In 1887 a particularly successful campaign was conducted for raising a "Queen's Jubilee Fund" of $250,000.

Queen's has an arts course, leading to the degrees of B.A., M.A. and Ph.D., and embracing literature, philosophy, history and science; a law course; a theological course; a medical course, and a science course. Its buildings comprise an arts building, the engineering building, Carruthers Science Hall, the medical

building, the physics and geology building, and Grant Hall, this last a fine convocation hall named for one of the most successful principals of the institution. The library contains over 70,000 volumes, and there are 100 members in the faculty and about 1,100 students. In 1917 the principal was the Reverend Daniel M. Gordon, whose biography is given on page 2538 in Volume Four.

QUETZAL, or **QUEZAL,** *ket sahl',* from the Nahuatl (Mexican) word *quezalli,* meaning *green feather,* is the name of a brilliantly-colored bird of the trogon family, found in Central America. It has a short neck, small, weak feet, a round crest and enormous tail coverts, three and a half feet long. The upper part is bronze-green, the lower crimson. The female has no long tail coverts and is colored brown and buff. The quetzal haunts the thickest parts of the forest, clinging to trees, like the woodpecker, but because of its weak feet it is unable to walk or climb. It is not shy and is very unsuspicious; the natives often kill the birds with clubs. The cry is two plaintive notes, swelling to a discordant scream. It builds no nest, but bores a hole in rotten stumps or trees. The American quetzal lives chiefly on fruit, lizards, small crabs, caterpillars, etc. The Indian and African quetzals feed upon insects.



QUETZAL

The quetzal is the national bird of Guatemala, and only chiefs are allowed to wear its feathers. See Trogon.

QUICK'SAND, a mass of loose sand mixed with water to such an extent that it is incapable of supporting the weight of a heavy body. The grains of sand, which have smooth, rounded surfaces, do not cling together to form a compact mass. Quicksands are often formed at the mouths of rivers or in their channels, or on seacoasts. In some cases a mass of quicksand may be firm and dry for hours, but when it becomes wet it shifts and becomes dangerous. Men and teams, as well as wild animals, have lost their lives by sinking in deep quicksands. Such a formation is not easily distinguished from ordinary sand and so is often a dangerous trap. Operating in quicksand is one of the difficult problems of engineering experts. One method of overcoming the instability of these formations consists in sinking brine-filled pipes into the sand, as a result of which the surrounding mass freezes and hardens. Caissons are also used (see Caisson).

QUICK'SILVER. See Mercury.

QUILLER-COUCH, *kwil'er kooch',* Sir Arthur Thomas (1863-), an English novelist, essayist and poet, known under the pen name of "Q," was born in Cornwall. He was educated at Trinity College in Oxford University, where he afterwards served as a lecturer on literature. He went to London in 1887 to become one of the editors of *The Speaker,* and in that year wrote his first book, *Dead Man's Rock,* a romantic story of adventures. It received some notice, but his real success as a novelist began with *Troy Town* and *The Splendid Spur.* These two stories described the quaint scenes and traditions of the Cornwall neighborhood which he knew so well, and impressed British critics as being thoroughly natural in style and plot. *The Delectable Duchy, From a Cornish Window,* and various other volumes dealing with his native section, greatly added to his fame. In 1921 he published *The Art of Reading.*

In 1891 Quiller-Couch left London to reside at Fowey, in the midst of the country which he had described with such romance and spirit, and in that village he has written more than thirty-five volumes of fiction and essays. His humor is developed not by mere word juggling, but by accurate pictures of the queer, ludicrous people and incidents observed daily in Western England. He is a realist in the best sense, for though he describes life actually as he sees it, he does not emphasize its dreary and pessimistic aspects, as many so-called realists are inclined to do.

QUINCE, *kwins,* a shrub or small tree of the rose family, which produces a fruit much used in making jellies and as a preserve. The tree is native to Asia and is now cultivated throughout Europe and in various parts of America. The fruit is golden yellow and very hard, and in shape resembles both the apple and the pear, to which it is related. When fresh it puckers the mouth, and is never eaten raw, but it has a delightful taste when cooked and is a favorite flavoring in marmalade and other fruit preparations. In America quinces may be raised as far north as New York; in that state are found the best orchards of any in the United States. The plant is propagated by cuttings. Some varieties are used as stock for dwarf varieties of pears (see PEAR).

QUINCY, *kwin'zi,* JOSIAH (1772-1864), an American orator, statesman and educator, born at Boston. After graduating at Harvard he studied law and soon began to take an active part in national politics. In 1804 he was elected by the Federal party to the Massachusetts senate, and the next year he entered Congress. There, as an opponent of Jefferson's policies, he displayed such power as a fiery orator that he quickly became a Federalist leader in the House. As one of the first men in that body to denounce slavery, he feared the purchase of slave-holding Louisiana and declared the act sufficient cause for disunion. This was the first declaration in Congress of the secession doctrine (see SECESSION). In 1812 he was so enraged by the American declaration of war against Great Britain that he refused a reëlection to Congress, and for some years devoted his time to his farms. In 1829 he accepted the presidency of Harvard University, and during the sixteen years of his administration made extraordinary improvement in the school's equipment, methods and standards. His *History of Harvard University* and *Life of John Quincy Adams* are still important for their bearing on early United States history.

QUINCY, *kwin'zi,* commonly called *kwin'si,* ILL., is the county seat of Adams County, a manufacturing town in the west-central part of the state, 104 miles west of Springfield, the state capital, and 142 miles northwest of Saint Louis. It is on the Mississippi River and on the Chicago, Burlington & Quincy, the Wabash and the Quincy, Omaha & Kansas City railroads. Steamboats and barges sail between this and other river ports. In 1910 the population was 36,587; in 1920 it was 35,978, a loss of nearly two per cent.

Quincy occupies an area of six square miles, on limestone bluffs 160 feet above the river, a site commanding splendid views of the river valley and surrounding country. The river is spanned at this point by a fine railroad and wagon bridge, and the harbor is ample. The city parks contain 300 acres, and have admirable landscape gardens. Prominent buildings are the courthouse, city hall, Federal building (which, with additions, was completed in 1911 at a total cost of $262,000), the state armory, Y. M. C. A. building, erected in 1914 at a cost of $110,000, the public library, the Quincy Historical Building and a Masonic Temple. Quincy has the Illinois State Soldiers' and Sailors' Home, two hospitals, Cheerful Home Settlement, Woodland Orphans' Home, Saint Aloysius Orphans' Asylum and Saint Vincent and Anna Brown homes. The educational institutions are Saint Francis Solanus College (Roman Catholic), Chaddock Boys' School (Methodist Episcopal), Saint Mary's Institute (Roman Catholic) and the Gem City Business College.

Quincy is favorably situated as a manufacturing and commercial center; power is obtained from the river, and in the vicinity are deposits of limestone, aluminum clay, glass sand and oil. The principal manufactures include stoves and ranges, engine governors, show cases and store fixtures, incubators, elevators, power pumps, machinery, fine vehicles, agricultural implements, dyes, air compressors, optical goods, shoes and cereals. According to local estimates the capital invested is $18,000,000 and the annual value of output exceeds $27,000,000.

The town was founded in 1825 by John Wood, who was later a governor of Illinois. It was incorporated in 1834 and in 1839 became a city. In the neighborhood are several prehistoric mounds (see MOUND BUILDERS). C.F.P.

Consult Collins and Perry's *Past and Present of Quincy and Adams County.*

QUINCY, MASS., in Norfolk County, a residential city comprising several villages, separated from Boston by the Neponset River on the north, and from Weymouth by the Fore River on the south. It is on Quincy Bay and is served by the New York, New Haven & Hartford Railroad and by electric interurban lines. The population of 1910, which was 32,642, had increased to 47,876 in 1920, a gain of 47 per cent. The area of the city exceeds sixteen and one-half square miles.

Faxon and Merrymount parks are the largest of several attractive pleasure grounds,

which have a combined area of 2,350 acres. Prominent features of the city are the Federal building, erected at a cost of $80,000, the Thomas Crane Public Library, the Quincy Mansion Girls' School, the Woodward School for girls, and a hospital, the gift of W. B. Rice. Although principally a residential city, Quincy has an extensive granite-quarrying industry, a large river shipbuilding plant, and manufactories to a total of 162; the capital employed (1920) was $30,466,000.

In and about Quincy are many places of historic interest. It is the birthplace of John Hancock, John Adams and John Quincy Adams; the Adamses are buried under the old Stone Temple, or First Congregational Church (Unitarian). Quincy was the home of Charles Francis Adams, and of Col. Francis Wayland Parker, who instituted noted educational reforms. The first railroad in New England was built here in 1826-1827, to carry the granite used in the construction of Bunker Hill Monument. The line was about four miles long and was run by horse power.

Quincy was settled in 1625 as Mount Wollaston. Thomas Morton gained control of the settlement about four years later and established the famous "New England Canaan," or "Merry-mount." He fostered "Maypoles" and other "idolls" obnoxious to the Pilgrims, and was consequently captured by Miles Standish and sent back to England. The settlement was a part of Braintree until 1792, when it was incorporated and named in honor of John Quincy. It became a city in 1888. J.O.H.

Consult Wilson's *Where American Independence Began;* Adams's *Three Episodes of Massachusetts History.*

QUININE, *kwi'nine,* or *kwineen',* an exceedingly bitter medicine obtained by a secret process from the bark of trees of the cinchona species, found native in South America and grown in India and other tropical countries (see CINCHONA). Quinine is especially valuable as a remedy for malaria (which see), and for reducing a fever temperature to normal. It is a nerve stimulant and general tonic through its power of increasing the flow of the digestive juices. Large doses cause ringing in the ears, dizziness and headache, and dangerously affect the blood pressure, even causing death, and the drug should be taken only as prescribed by a reliable physician. Pure quinine forms silky, needlelike crystals which unite with acids to form salts. It is one of the most effective drugs. See MEDICINE AND DRUGS.

QUINSY, *kwin'zi,* a form of sore throat which usually results in the formation of an abscess in the region of the tonsils. One or both sides may be affected. It is caused by exposure to cold or dampness, and begins with chills, exhaustion, fever and pain in the throat. As the disease progresses the affected tonsil swells until swallowing and even opening the mouth become exceedingly difficult and painful. In severe cases the patient has alternate chills and sweats, and at night becomes delirious. Though the ailment is not usually fatal, generally ending in from five to eight days with the bursting of the abscess, there are cases on record of death by suffocation, caused by the bursting of the abscess while the patient was asleep. If taken in time an attack can often be promptly checked. The patient should rest quietly in bed, gargle the throat and take purgatives and a dose of quinine. A developed case needs the attention of a reliable physician. Lancing the abscess and draining out the pus, if done by a competent doctor, always bring immediate relief. Quinsy does not usually attack children or people past forty, but the same person may suffer from recurring attacks. It is generally advisable to remove diseased tonsils.

QUINTILIAN, *kwin til'i an* (MARCUS FABIUS QUINTILIANUS) (about A.D. 35 - about 97), a Roman rhetorician, born at Calagurris, in Spain. Information about the events of his life is meager, but it is probable that his family removed to Rome while he was but a boy, and that there he grew to manhood. After spending some years in Spain he returned in 68 to Rome with Galba, and began to practice as an advocate. It was as the head of a school of oratory that he was best known, however, and Vespasian created for him a liberally endowed chair of rhetoric. He taught for about twenty years, and after his retirement spent two years in the composition of his great work—the *Institutio Oratorio,* an exhaustive system of rhetoric. The twelve books which compose the *Institutio* deal with the training of a would-be orator from infancy, and demand for him an all-embracing education. Quintilian's literary judgments are most true and sympathetic, and the character which he shows is unusually attractive. There are extant 164 declamations which are credited to Quintilian, but their authorship is by no means certain.

QUIRINAL, *kwir'i nal,* or *kwi ri'nal,* a famous hill of ancient Rome, apart from the older City of the Seven Hills, but included in the area within the Servian Wall. On it in the

days of the city's ancient splendor were the temple of Quirinus and the baths of Constantine and Diocletian. A palace on the hill, erected by Pope Gregory XIII, is now the residence of the king of Italy, and is thus of world-wide note. Quirinus, the god in whose honor the hill is named, was one of the most important of Roman deities, a god of war only slightly inferior to Mars. See ROME, for map.

Quirinal Palace, a palace in Rome, on the Quirinal Hill, which since the formation of the Italian kingdom has served as the royal residence. Previous to that time it was a summer residence of the Popes, having been begun for that purpose by Gregory XIII in 1574. Noteworthy among the works of art which it contains is an *Annunciation* by Guido Reni.

QUIRINUS, *kwi ri'nus,* the name given in ancient Rome to a deity who held third place in the Pantheon; only Jupiter and Mars outranked him. At the time of the supremacy of Rome there grew up a tradition that this god was Romulus in his deified state. Extraordinary honors were paid him, and his festival on February 17 was celebrated with great pomp.

QUIRITES, *kwi ri'teez,* a name applied to the citizens of ancient Rome with reference to their civil relations. It was distinguished from *Romani,* which was applied to the citizen body in connection with military and political affairs. It is supposed that *Quirites* was the original name of a tribe of the Sabines, and as both Romans and Sabines comprised the nation, it was appropriate that the two terms should be used to designate its citizens.

QUIT'CLAIM. See DEED.

QUITO, *ke'toh,* the capital of Ecuador, is one of the oldest cities of South America and one of the most elevated in all the world. It nestles in a ravine on the east side of the volcano Pichincha, over a mile and three-quarters above the level of the sea, or exactly 9,350 feet. Owing to its elevation its climate is always springlike, in spite of the fact that it is only about fifteen miles south of the equator. With lofty mountains and snow-clad volcanoes all about, Quito is very much shut off from the world, although one railroad connects it with its seaport, Guayaquil, 165 miles directly southwest.

The plan of the city is that of a square. The streets are unpaved, and most of them are narrow, steep and somewhat hazardous to climb, but electricity has been installed for lighting. Several plazas with flower gardens and fountains relieve the monotony of rows of low, simple adobe structures which make up most of the city. The largest of these is Plaza Mayor, and facing it are several handsome buildings, the cathedral, the archbishop's palace and the government buildings. Besides the above, throughout the city various churches and convents, the university, several museums, a few colleges and a hospital are built in more interesting styles, departing from the simple patterns prevailing. The usual low, unattractive buildings are due to frequent earthquake visitations. About one-fourth of the area of the city is covered by establishments of the Roman Catholic Church.

Public fountains, fed by open ditches from the mountains, furnish the city's water supply. A telephone system provides a means of communication throughout the city and suburbs, and the cable, wireless telegraph and telegraph connect the city with the rest of the country and the world.

The People. The population, which is chiefly Spanish and Indian, was estimated at about 70,000 in 1922, not quite one-tenth that of Saint Louis, Mo. The needlework and laces made by the women of Quito are famous. Religious paintings and carvings of wood, vegetable ivory, gold and silver are exported. Other industries which keep the inhabitants of this ancient city busy are leather tanning, the making of shoes, sandals, carpets, woolen and cotton cloths and drying of bird skins. There are flour mills, one foundry, one ice factory and two sugar factories in the city, as well as establishments for the making of wagons, carts, bricks, tiles, chocolate, cheese and candles.

For centuries Quito was the capital of an old Indian nation of which practically nothing is known. In 1470 it was captured by the Incas, and it was there that the famous Atahualpa ruled in luxury and splendor from 1529 until the Spaniards took all Inca lands in 1534. See ATAHUALPA; INCA; ECUADOR. M.S.

QUOITS, *kwoits,* a game which consists in tossing iron rings, also called quoits, at a peg thrust into the ground. In America horseshoes are frequently substituted for quoits. The pegs are set on a green, usually eighteen yards apart. At these pegs the player delivers the quoits, which are eight inches in diameter, with a rim from one to two inches in breadth. Each player casts two quoits and then yields his place to an opponent. As many as desire may take part. The winning side is that which first secures a score of either 11 or 21, as may be agreed. In a game of 11 points a *ringer,* a quoit

which encircles the peg, counts 3; a *leaner,* a quoit which leans against the peg, counts 2. In a game of 21 points a ringer counts 5; a leaner, 3. Whenever there are neither ringers nor leaners the quoit nearest the stake counts 1; if the two nearest quoits are thrown by the same person, he counts 2.

Consult Spalding's *How to Pitch Quoits.*

QUORUM, *kwo'rum.* In the organization of an assembly a quorum is the number of members who must be present in order that the body may transact business legally. Voluntary organizations, such as are not responsible to anyone outside of their membership, do not require a quorum, although many make such provision.

In public bodies the quorum is usually fixed by the constitution or by-laws. When the assembly is a representative body, performing the functions of government for a constituency, or when the body is of the nature of a board of managers, or trustees, carrying on the business of the corporation which elected them, the majority of the members usually is required to form a quorum, and the vote of the members themselves cannot change this requirement.

In the halls of probably every legislative body in the world measures are debated when a quorum is not present, by general consent not to recognize the fact, but when the hour for voting is reached a hurried call for absent members usually brings to their seats a number sufficient to give legality to the proceedings. See PARLIAMENTARY LAW.

QUOTATION, MARKS *kwo ta'shun,* are punctuation symbols used before and after certain quoted expressions. They are generally used in pairs, but quotations within quotations are enclosed by single marks. The marks at the beginning of the quoted passage are inverted commas; those at the end are apostrophes, as " ".

The following are the most important rules for the use of these marks:

A direct quotation is set off by quotation marks, as: Nelson said, "England expects every man to do his duty."

Citations of a passage in the author's own words, when run into the text, are enclosed by quotation marks. Passages set off by themselves are frequently printed in different type and the quotation marks omitted.

When several paragraphs are quoted and quotation marks are used, it is customary to place the symbols at the beginning of each paragraph and at the end of the last one.

A word or phrase accompanied by its definition is set off by quotation marks, as: In printing "to kill" means to destroy type. Technical, unusual, slang or coined expressions are set off by quotation marks. This is also true of nicknames, popular names of states and cities, pen names and the like. In all of these cases, however, some authorities prefer italics.

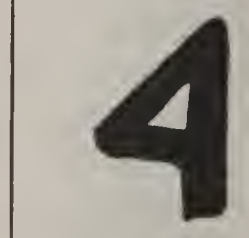
The English equivalent of a foreign word or phrase is enclosed by quotation marks.

Either italics or quotation marks are used to set off names of ships, names of pictures and titles of poems, books, lectures, sermons, periodicals and the like.

Some authorities place the final pair of quotation marks after the semicolon when that symbol closes the quoted passage. Others place the marks before the semicolon. See PUNCTUATION.

THE WORLD BOOK
ORGANIZED KNOWLEDGE IN STORY AND PICTURE
TRADE MARK REGISTERED

Rr



R is the eighteenth letter of the English alphabet. The Phoenician letter from which it is derived was called *resh,* which means *head;* in form it probably originally represented a head in profile. It was more like a *P* than an *R,* but was turned around with the projection to the left, and this upper part was angular instead of cúrved. The Greeks adopted the letter and made it precisely like a modern capital *P,* but the Romans added the extra line to distinguish it from the *P,* which with them assumed its present form.

In sound *r* has always been practically what it is in English. It is a consonant, but has much of the character of a vowel and is therefore classed with the semivowels. It closely resembles *l,* from which some peoples find it impossible to distinguish it; and the two have been frequently interchanged in the history of words. Theoretically, *r* is pronounced with a slight trilling sound; in reality, it is rarely so used in English. Many persons never pronounce an *r* unless it is followed by a vowel, sounding *far* almost as if it were spelled *fah;* but it always serves to modify somewhat the vowel sound which precedes it.

RABBI, *rab'eye,* a name of respect which the Jews applied to a doctor or teacher of the law. Another form of the word, and one denoting even greater respect, was *rabboni.* Neither of the words was used in Old Testament times, but they seem to have been in very general use at the time of Christ, for His disciples often addressed Him by one of the two terms. In *John* I, 38, the word rabbi is translated *master.* Rabbi is now the title of the minister or preacher in a Jewish synagogue.

RABBIT, *rab'it,* an interesting representative of the rodent group (the gnawing animals). The wild rabbit is a native of Europe, but domesticated species are found in most parts of the world. Rabbits belong to the same family as the hare, and in America the two names are often used interchangeably (see Hare). The "jack rabbit" has no right to its name, as it is a hare.

THE RABBIT

Rabbits differ from hares in appearance, in that they are smaller and have shorter ears and legs; they differ in habits, in being less fleet, in living in colonies in underground burrows, called *warrens,* and in giving birth to blind, almost hairless young. Like hares, they multiply rapidly, breeding several times a year. They begin breeding at the age of six months, and produce five to eight young at a birth. Tender grass, clover, lettuce, cabbage and bark of young trees are favorite foods. Great damage is often wrought by hungry rabbits, and in Australia and New Zealand they have increased so rapidly as to become pests. There the farmers protect their crops with specially-made wire fences. The favorite haunts of the rabbit are hillsides and sandy heaths. It is well protected by its keen scent and hearing.

Native rabbit fur is soft and fine, and of a nearly uniform brown color which turns white in winter. In its white state it is used in imitation of ermine and chinchilla. The skin, cleared of hair, is used with other skins to make glue and size. Rabbit flesh, cooked in stews or fried, is a palatable food.

Domesticated Rabbits. The texture of rabbit fur has been changed through domestication, and in ten distinct varieties the color varies from white to black. Changes in the appearance of the ears have also developed, some being small, erect and stiff, and others broad, soft and hanging.

The *Belgian hare,* one of the best-known species in America, is a true rabbit. It is a large animal, weighing about ten pounds, and has a broad head which tapers to the nose; the long ears are thin and transparent, and the eyes are bright brown. This rabbit is easily raised, and its flesh is considered excellent. The *lop-cared rabbit,* distinguished by its long ears, which are about twelve inches in length, is the oldest fancy variety of rabbit. It requires much careful attention. The small *Dutch rabbit,* which weighs only four pounds, is one of the smallest of domestic rabbits. It is hardy and beautifully colored, the fur being a combination of white and of black, blue or lemon. The *Angora* rabbit, like Angora goats and cats, has a silky coat of long, white hair which can be cut and woven. This species is also hardy. Then there are the dark, silky-haired *Siberian;* the *Himalayan,* valued for its skin, which closely resembles ermine; the large *Patagonian* and *Flemish* rabbits; the fancy *silvertip,* and the delicate, white *Pole,* weighing only three pounds.

Care of Rabbit Pets. It is by the ears that one must always handle a *bunny,* as rabbits are affectionately called, for the body bones are delicate, especially in the young. If secured when over six weeks old they can feed themselves. A little bran mixed with hot water or hot milk and a pinch of salt should be given them two or three times a day. Occasionally they may have turnip tops, cabbage, lettuce leaves or carrots, of which they are very fond. Too much vegetable food, however, will make them sickly. After they are six months old they should have a larger proportion of dry food. Oats given once a day, a little water now and then, a few baked potatoes or some clover for a change, will keep them in good health. They must be allowed to run about and exercise at least once a day, and careful watch must then be kept that cats, rats or dogs do not attack them.

Consult Townsend's *Practical Rabbit Keeping;* Morant's *Rabbit Farming.*

RABELAIS, *ra b'leh',* FRANÇOIS (about 1483-1553), a French humorist and satirist, one of the greatest literary figures in France during the sixteenth century. His most celebrated work, *Gargantua and Pantagruel,* is one of the earliest masterpieces of French prose. It relates the adventures of Gargantua, a giant with an enormous appetite, whose gluttony had made him notorious, and the amazing deeds of Pantagruel, the "king of Drunkards." The work is a mingling of pure banter and keen and witty ridicule of politics, the Church and education as they existed in the author's day. It was published in sections, the first book, *Pantagruel,* appearing about 1533.

Rabelais was by turns priest, physician and story-teller. He was born at Chinon, and was educated in the monastery schools. He joined the Franciscan Order and became a priest, but his ardent pursuit of the Hebrew, Arabic and Greek and Roman classics offended his brother monks, and after living for a time in the abbey of the Benedictines, he gave up monastic life. In 1530 he began the study of medicine at Montpellier, where in 1537 he was granted a doctor's degree. In the meantime he was appointed head physician of the great charity hospital at Lyons, a position which he held until about 1536. Later he was physician to the town of Metz, and shortly before his death served as curate in the parish of Meudon.

RACCOON, *ra koon',* or **COON,** a greedy, inquisitive little American animal, closely related to the bear, although of small size. It is found from Canada to the tropics. It is a midnight prowler, and coon hunts on moonlight

THE RACCOON

nights are popular in the South. Raccoon flesh, roasted, is considered a delicacy, and in colonial days sleigh robes, overcoats and caps of coonskin were highly prized. Raccoon fur is still used to some extent for these purposes. There is a raccoon farm at New Sydney, Nova Scotia; the Canadian production of coon fur in 1911 was valued at over $7,000.

Raccoons measure about thirty-two inches in length, including the tail. They weigh from

twenty to twenty-five pounds. Their stout bodies are covered with long, coarse hair, which is grayish and black-tipped. The tails are bushy, grayish-white, with definite rings of black. A coon's face, with its sharp, delicate nose, and patch of black around each eye, set off by surrounding whitish hairs, is foxlike and has a look of cunning. These animals are famous tree climbers, having long legs and strong claws. Their favorite haunts are hollow trees, and in cold climates they hibernate in such woodland homes (see HIBERNATION). Although, like bears, coons eat almost anything which comes their way, frogs, crabs, turtles and other water animals are favorite articles of diet, and juicy corn crops are often ruined by visits from these greedy visitors. They always wash their food before eating it and are fond of paddling in water. Robbing birds' nests and chicken coops are perhaps their worst faults.

From three to six young are born at one time, usually in April or May. They are blind and helpless at first, and are cared for by the parents for at least a season. The cry of the young resembles that of human babies. Coons are easily tamed and are amusing pets.

The *agouara,* or crab-eating raccoon, is found in South America. A Himalayan species is called the *punda.*

From 1838 to 1844 the raccoon was the emblem of the Whig party in the United States, and members of that party were popularly called *coons.* The famous log cabins of the Harrison and Tyler campaign of 1840 always had coonskins nailed to the exterior.

Consult Stone and Cram's *American Animals;* Seton's *Life-Histories of Northern Animals.*

RACE, any trial of speed among contestants, such as running, rowing, swimming, riding and driving. Since the days when the prehistoric peoples escaped the cave bear by fleetness of foot contests of speed have continued to excite the keenest interest. The successful runner in the Greek games was crowned with a wreath of laurel, and was honored by all the people. The games at Rome were not less popular. In modern times, such contests are a regular part of the rivalry among colleges, especially in America.

With the invention of mechanical devices for increasing the speed with which man was able to propel himself, bicycle, motorcycle and automobile races were added to trotting, pacing and running races as popular diversions. Of these, the automobile race is the most thrilling, because of the very great speed attained by expert drivers. Yachting and rowing races have their enthusiastic followers, but they can hardly be called popular sports. The only yachting event in America which rouses general public interest and excited partisan loyalty is the race for an international cup, for which representatives of England and America have sailed at intervals since about 1890.

Bicycle racing was once almost a rival of horse racing in America, but is very little followed now except in contests on prepared courses in large buildings, continuing for six days without interruption. Records of 1,700 miles for winning "teams" have been earned. Horse racing itself, once the most royal of sports, called "the sport of kings," has fallen upon evil days as a result of the demoralization that came from the betting ring. Races frequently were "fixed," that is, arranged between owners; and when the public came to understand that it was not always permitted to see the best horse win, interest declined, and in nearly all great centers of population racing has been prohibited by law. However, the American tradition of the turf is a fine one, for American breeders produced some of the swiftest animals on the track in the days when racing was at its cleanest and best. Horses are matched in trotting, pacing and running races, and are further divided into classes corresponding to their speed.

Speed Records by Horses. The harness race was developed in America, and the early trotters and pacers of the United States had no equals. In harness races, the mile has been the standard distance, and the time was lowered from a little more than three minutes at the time of the death of the first great trotter, "Imported Messenger," in 1808, to 2:08¾ in 1884. The latter record was made by one of the greatest of American harness horses, "Maud S," in competition with her equally great rival, "Jay Eye See." The introduction of ball-bearing axles and pneumatic tires a little later was an important mechanical aid to speed, and its effect has been shown in still lower records for the mile. "Lou Dillon," a comparatively unknown mare, was the first horse to trot a mile in two minutes. She accomplished this feat, not in a race but in an exhibition mile behind pacemakers. Later, under similar conditions, she went a mile in 1:58½. The fastest time made by a trotter up to 1917 was 1:54½. "Uhlan," accompanied by a pacemaker and protected by a wind shield, covered a mile in that time at Lexington, Ky., in 1913. "Dan Patch"

established the pacing record of 1:55 at Saint Paul in 1906. The best running record for a mile is 1:35½, established by "Salvator" in 1890. In England running races have always been more popular than harness races, and one of the greatest turf events of the world for many years has been the English Derby, run at Epsom, near London.

Automobile Races. Quite the most thrilling of modern spectacles are automobile contests, on speedways or country courses. They are international in character and attract the most expert drivers of the world. Courage and staying power, together with exceptional presence of mind and constant alertness, are absolutely necessary to the driver's life in his headlong flight over such courses as are run for the French Grand Prix, the Vanderbilt Cup, and the speedway cups at Chicago and Indianapolis. Great distances are covered in these races; the pace for the mile is less regarded than the ability of a driver to maintain a terrific speed for hundreds of miles. Records established on American speedways for 100, 400 and 500 miles are 56 minutes, 57.72 seconds; 4 hours, 4 minutes and 39 seconds; and 5 hours, 7 minutes and 26 seconds, respectively. The world's record for a twenty-four hour run, established in 1916 by Mulford, is 1,819 miles. Competition among car builders, who wish the honor of placing a winning car in the great races of the year, is scarcely less keen than among drivers, since the advertising value is clearly recognized. The amount of money spent on automobile racing is now an enormous sum, and its popularity appears to be growing, in spite of the fatalities that are too often a result of the terrific pace maintained.

Related Subjects. The reader is referred to the following articles in these volumes:

Athletics	Laurel
Automobile	Motorcycle
Bicycle	Yacht and Yachting

RACES OF MEN. The origin of man, the time of his advent upon the earth and the manner in which the different races of men came into existence are questions that have always interested the world. Notwithstanding the fact that some of the most noted scientists of the last two centuries have devoted much time to the study of these questions, none of them is settled. Any estimate of the length of time that man has lived upon the earth is a mere hazard, as is seen by comparing the estimates of different authorities upon the subject, which vary from 10,000 to several hundred thousand years. All that can be said about the time is that it is very long, and it can be estimated only by tens of thousands of years.

There are two theories concerning the origin of man. The first is that he was a special creation, as explained in the first chapter of *Genesis*. For centuries no other theory was considered by the Christian world, and this theory is still widely held. The second theory is that man sprang from the order of Primates, to which the apes belong, and has reached his present state through long ages of development.

The question of the division of mankind into races is also one concerning which there is a wide difference of opinion. These differences arise from the extreme difficulty of arriving at a common basis of classification. The old classification and the one with which most of us are familiar is that which is based chiefly upon the color of the skin, but also takes into consideration the shape and size of the head and the peculiarities of the features. This classification divided mankind into four races—the Caucasian, or white; the Mongolian, or yellow; the Malay, or brown, and the Negro, or black. To these Blumenbach added the red, or American, race. Each of these races was subdivided into various branches, those of the white race being the Hamitic, the Semitic and the Aryan, or Indo-European.

Recent investigation and discoveries by anthropologists have caused many of them to set this classification aside in favor of one based upon a consideration of the color and form of the hair, form of the head, form of the nose, color of the skin and stature. This classification, known as Deniker's, divides the human race into six groups and twenty-nine races, as follows:

I. Woolly Hair, Broad Nose
   1. Bushmen
   2. Negrito
   3. Negro
   4. Melanesian

II. Curly or Wavy Hair
   5. Ethiopian
   6. Australian
   7. Dravidian
   8. Assyroid

III. Wavy Brown or Black Hair, Dark Eyes
   9. Indo-Afghan
   10. Arab or Semite
   11. Berber
   12. Littoral European
   13. Ibero-insular
   14. Western European
   15. Adriatic

IV. Fair, Wavy or Straight Hair, Light Eyes
   16. Northern European
   17. Eastern European

V. Straight or Wavy Hair, Dark Eyes
- 18. Ainu
- 19. Polynesian
- 20. Indonesian
- 21. South American

VI. Straight Hair
- 22. North American
- 23. Central American
- 24. Patagonian
- 25. Eskimo
- 26. Lapp
- 27. Ugrian
- 28. Turkish or Turco-Tatar
- 29. Mongol

Population of the Earth According to Race

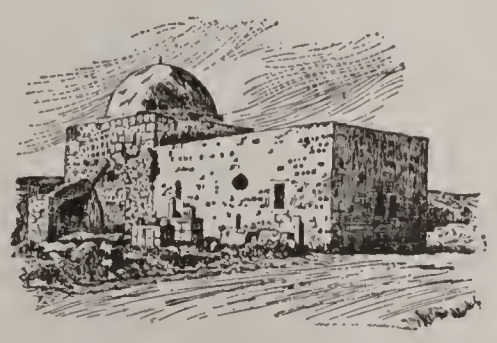
RACE	LOCATION	NUMBER
Indo-Germanic or Aryan (white)	Europe, America, Persia, India, Australia	795,000,000
Mongolian or Turanian (yellow and brown)	Asia	630,000,000
Semitic (white)	Africa, Arabia, etc.	70,000,000
Negro and Bantu (black)	Africa	134,000,000
Malay and Polynesian (brown)	Australasia	35,000,000
American Indian. North and South (red and half-breeds)		27,000,000
Total		1.691.000,000

Consult Haddon's *The Wanderings of People;* Deniker's *The Races of Men.*

Related Subjects. The reader who is interested in the details of this subject is referred to the following topics in these volumes:

Anthropology (with list of peoples and other related topics)
Archaeology
Ethnography
Ethnology
Evolution, subhead *Descent of Man*
Geology

RACHEL, *ra'chel,* the favorite wife of Jacob. To win her he served her father (Laban) seven years, "and they seemed unto him but a few days for the love he had to her" (*Genesis* XXIX, 20). Offered Leah in her stead, Jacob had to serve Laban seven more years. Rachel's elder son was Joseph, beloved above his brethren; her younger son was Benjamin, "the little one," born in the last stages of the family's long journey from Mesopotamia to Canaan. After the birth of Benjamin, Rachel died. She was considered the tribal mother of the northern tribes of Israel, and when they were carried into captivity, she was represented as being inconsolable in her grief (*Jeremiah* XXXI, 15). This passage is quoted (*Matthew* II, 18) in the account of the murder of the innocents by Herod:



TOMB OF RACHEL

A voice was heard in Ramah,
Weeping and great mourning,
Rachel weeping for her children;
And she would not be comforted because they are not.

RACHEL, *ra shel'* (1821-1858), one of the greatest of French tragic actresses, was born in Switzerland of Jewish parents. Her real name was Elisabeth Rachel-Félix. She began her career at the age of four, singing on the streets of Lyons. When she was nine years old, she and her elder sister sang on the Paris streets, and their voices, crude and rough as they were, attracted the attention of the director of a school of music; he took them immediately under his protection and gave them instruction. Mlle. Rachel, however, soon lost her singing voice, and began to study dramatics with Saint-Aulaire, a noted actor. In 1836 she became a pupil at the Paris Conservatory, and the following year made her first professional appearance. Her début excited no great attention, but in 1838, in the *Horace* of Corneille, she won a gratifying success. In 1855 she toured the United States, but her voice was impaired, and the venture was not a success. She died in 1858, of tuberculosis, and was buried in the Jewish section of Père Lachaise, the most famous cemetery of Paris. Her best rôles were always those in plays of Racine and Corneille, and her interpretation of the leading part in Racine's *Phèdre* has never been surpassed. Within her special range—the portrayal of human suffering—Rachel has, perhaps, never had a rival.

ELISABETH RACHEL-FÉLIX

RACINE, *ra seen',* Jean Baptiste (1639-1699), one of the foremost writers of poetic French drama. He was preëminently a tragedian, and the presentation, in 1667, of *Andromaque,* the first of his seven masterpieces of

tragedy, was an event of great moment in the history of the French drama. Racine was born at La Ferté-Milon, and received a good education. The outstanding features of his college days were the religious impressions he received from his puritanic teachers and the thoroughness with which he studied the Greek classics. Sophocles and Euripides were to him the ideal dramatists. In 1662 he settled in Paris, was presented to the king and became a poet of the fashionable element. At the same time he formed friendships with Boileau, Molière and other notables in the literary world. His great tragedies — *Andromaque, Britannicus, Bérénice, Bajazet, Mithridate, Iphigénie* and *Phèdre*—were produced between 1667 and 1677.

In the latter year he ceased writing for the stage, partly because he was incensed at the criticism of a hostile theatrical clique, and partly from religious motives. *Esther* and *Athalie,* two Biblical dramatic poems, were written several years afterward, but neither was publicly produced before his death. Racine was primarily a poet of the cultured and fastidious; he has never appealed to the masses. In his plays the dramatic element always stands out clearly, and character portrayal is subordinate to the development of the plot.

RACINE, Wis., the county seat of Racine County, situated in the southeastern corner of the state, on Lake Michigan, at the mouth of the Root River. Next to Milwaukee it is the leading manufacturing city in the state. The population in 1910 was 38,002, and had increased to 58,593 in 1920 (54 per cent gain). The area is nearly six square miles. Racine is twenty-four miles south of Milwaukee, sixty-five miles north of Chicago, on the Chicago & North Western and the Chicago, Milwaukee & St. Paul railroads and on interurban lines. The harbor is good and the city has steamship lines to other lake ports.

The features of the city are its fine parks, Luther College and Racine College (Protestant Episcopal), Saint Catherine's Academy (Roman Catholic), the Federal building, Carnegie Library and Y. M. C. A. building. Prominent institutions are Saint Luke's and Saint Mary's hospitals and the Taylor Orphan Asylum. There are important manufactures of threshing machines, automobile parts, farm implements, malted milk and electrical supplies. Foundry and machine-shop products, leather, boots and shoes, trunks and valises, hardware and lumber products are also manufactured. The total value of the factory output is over $43,600,000 a year. The place was founded in 1834, incorporated in 1843 and became a city in 1848. W.H.R.

RACK, an ancient instrument of torture, used to extort confessions from criminals and heretics. It was an oblong, wooden frame with rollers on each end. On this frame the victim was bound and questions were put to him; if he remained stubborn and refused to answer the rollers were gradually turned by means of levers, stretching the victim until the joints became dislocated.

The rack was used by the Romans, especially for the torture of Christians, and was in frequent demand during the Inquisition. Its use was introduced into England in 1447, but in 1628 its legality was contested, and the instrument fell into disuse.

RADCLIFFE, *rad'klif,* **COLLEGE,** a college for women which has been officially connected with Harvard University since 1894. It is the outgrowth of the Society for the Collegiate Instruction of Women, which was organized in 1882. The name Radcliffe College, adopted by act of the General Court of Massachusetts in 1894, is in honor of Ann Radcliffe, the first woman to give a money endowment to Harvard University. The buildings of the college, which include administration and lecture buildings, a library containing about 32,000 volumes, a gymnasium and several residence halls, are located about three blocks from the Harvard campus, in Cambridge, Mass. Tuition is $200 a year, and board and lodging in the college dormitories range from $288 to $540.

The requirements for admission are the same as those adopted by the university for men, and the courses of study, which are in charge of Harvard professors, are practically identical with those offered by the men's institution. The university museums and libraries are open to the students of Radcliffe. The enrolment is about 675, and the faculty numbers about 150. See HARVARD UNIVERSITY.

RADIO. See pages 6320-6328.

RADIOACTIVITY, *ra'di o ak tiv'i ti.* After the discovery of Roentgen rays, or X-rays, in 1895, physicists experimented with a number of substances for the purpose of ascertaining whether or not they possessed the property of giving off similar rays. In 1896 Henri Becquerel of Paris wrapped a photographic plate in black paper and laid a coin on the paper covering the sensitized surface, suspending above it a piece of uranium ore. After several days he developed the plate and obtained an

image of the coin. This experiment proved that the salts of uranium gave off rays that affected the photographic plate. These rays were named *Becquerel rays,* and the power of giving off the rays was called *radioactivity.* Further experiments proved that thorium, polonium and other similar substances were also radioactive. Attempts to separate this radioactive substance from the ores containing it were made by a number of physicists, and separation of radium (which see) from pitchblende was one of the result of these experiments.

Radium is the strongest radioactive substance known, but the rays given off by other radioactive substances produce effects similar to those given off by radium and similar to the effects of Roentgen rays. These effects are described under RADIUM and ROENTGEN RAYS.

Consult Letts's *Some Fundamental Problems in Chemistry.*

RADIOLARIA, *ra di.o la' ri a,* an order of minute one-celled animals found in the warm seas. They belong to the lowest branch of the animal kingdom (see PROTOZOA), and have the body covered with a tiny shell of silica. After a radiolarian dies its shell sinks to the ocean floor, and the accumulations of countless shells have caused the formation of thick layers of ooze in many parts of the sea. Fossil remains of these shells constitute a large part of the rock known as *tripoli* and of *Barbados earth,* both of which are used as polishing powder. The name of the order has reference to fine threads of protoplasm which project from the cell body through apertures in the shell and radiate in all directions.

RAD'ISH, a little vegetable cultivated for the root, which is eaten as a relish or salad. It grows either turnip shape or elongated. The plant is related to the mustard, and above ground looks very much like it except that the flowers are white instead of yellow. The seeds may be sown in very early spring, if sheltered spots are chosen, in well-prepared rich soil, about an inch below the surface. They should not be allowed to mature closer than one in each two inches of the row, and should be ready to eat about three weeks after planting. Seeds may be planted every two weeks during the spring, which insures crisp, good radishes for table use throughout the season.

THE RADISH

The food value of the radish is low, and as a heat producer it has very little value—only 135 calories per pound (see CALORIE).

RA'DIUM, the most costly and most wonderful substance in the world, valued at $3.402,000 an ounce, was discovered in 1898 by Professor and Madame Curie. Radium is a simple substance, or an *element,* and in its pure state looks like silver, but it is used in the form of a chloride which resembles common salt. Radium is a hundred times more precious than diamonds, in proportion to its weight. A glass tube of this substance which looks like a bit of fine straw and is shorter than a pin is worth $4,000. The wonders of radium are not yet fully known, and the cause of its intense activity has never been explained.

Properties. Radium gives off but little light, and its activity is learned only through the effects produced. It gives off enough heat to melt its own weight of ice every hour, or to raise its own weight of water from freezing to boiling point. When a tube of radium is placed on a surface coated with sulphite of zinc, or some other similar substance, the screen becomes luminous. It discharges electrified bodies and makes any gas on which it acts a conductor of electricity. It affects photographic plates. If a photographic plate is wrapped in black paper and an opaque object such as a penny is coated with radium and laid upon the paper with the coated side up, a picture of the object will be produced on the plate.

Radium destroys the life in seeds, and causes severe burns and ulcers when placed near the flesh, even for a short time. Tubes containing it cannot be safely handled with the bare hands. Radium and some other like substances when dissolved in water produce a peculiar emanation or gas that is used in the treatment of certain diseases. This intense activity of radium does not cause appreciable loss of weight or power. It is estimated that the number of atoms lost is so small that during a period of over 1,700 years a quantity of radium would lose only half its weight.

Uses in Medicine. The action of radium upon the tissues of the body makes it a valuable agent in the treatment of superficial cancer, for the removal of scars, warts and corns, and in the treatment of that form of goiter that causes the eyes to protrude from their sockets. The radium may be applied directly to the part to be treated or it may be given internally in solution. So powerful an agent requires care and skill in its use. See CANCER.

Production of Radium. Radium was discovered in pitchblende, an ore of uranium (which see), and for a number of years this ore was the only source of supply. The ore was at first mined in Bohemia; then deposits were discovered in Sweden and Wales. For a number of years the manufacture was carried on exclusively in France and Germany, and it was supposed that pitchblende was the only ore from which it could be obtained. But experiments with other ores of uranium showed that they also contained radium; and carnotite, a compound of uranium, potassium, and some other substances, has now become the chief source of supply. Extensive deposits of carnotite occur in Colorado and Utah, and the United States is now considered to be the chief source of radium-producing ore.

The manufacture of radium is a long, tedious chemical process, complicated by many difficulties and requiring special care and skill. Previous to 1912 there were no laboratories for its production in the United States, and the carnotite was sent to Europe. In that year the United States Bureau of Mines established a laboratory at Denver, and since that time this bureau, in coöperation with the National Radium Institute, has expanded the laboratory into a plant for producing radium on a commercial scale. In 1915 this plant was in successful operation, and new processes had been discovered by which the expense of production was greatly reduced.

By the original processes less than one-half a grain—375 milligrams—of radium could be obtained from a ton of pitchblende. In 1920 there were only seven ounces of radium in the world. There were only three or four producing companies in 1920, and the largest produced only about an ounce in an entire year. Some idea of the delicacy of the chemical operations may be obtained from the statement that there is extracted from the ore a substance that exists in proportion of one part to 200,000,000. See CURIE, PIERRE AND MARIE SKLODOWSKA; RADIOACTIVITY. O.B.

Consult Soddy's *Interpretation of Radium;* Malcolm's "Notes on Radium-Bearing Minerals," in *Canada Geological Survey, Proprietor's Handbook, No. 1;* Moore and Kithill's "A Preliminary Report on Uranium, Radium and Vanadium," in *United States Bureau of Mines Bulletin No. 70.*

RAFFIA, *raf'ia,* flat, ribbonlike strips of fiber, torn from two kinds of palm grown in tropical regions, chiefly in Madagascar and Brazil. The hard, outside fibers and the stalks of these palms are used by the natives in building houses and fences. The inner fibers and also the leaves are soft and light, and are so pliable that they can be bent to any shape, and also they may be dyed in any color. The natives make practically all their clothes, as well as baskets, mats and small fancy bags, of raffia fiber. The fiber is exported in large quantities to many countries, where it is used for similar purposes. It is also used extensively in greenhouses as a wrapping to protect plants and young trees from bruises or cold.

Use in Schools. The ease with which useful and artistic products may be made from raffia has led to the introduction of raffia weaving as a regular feature of construction work in the school grades. The teacher finds that basketry and weaving are the best forms of industrial training, as they are adaptable to any school grade, and the materials are cheap and easily handled. The articles made have little value, but the children's hands are trained, which is the result greatly desired. The search for materials and the study of their sources tend to make geography and history more real to the child.

Rugs and other articles for the home may be made from raffia or old matting. It is customary to combine raffia and rattan reeds in the making of baskets, but there are many

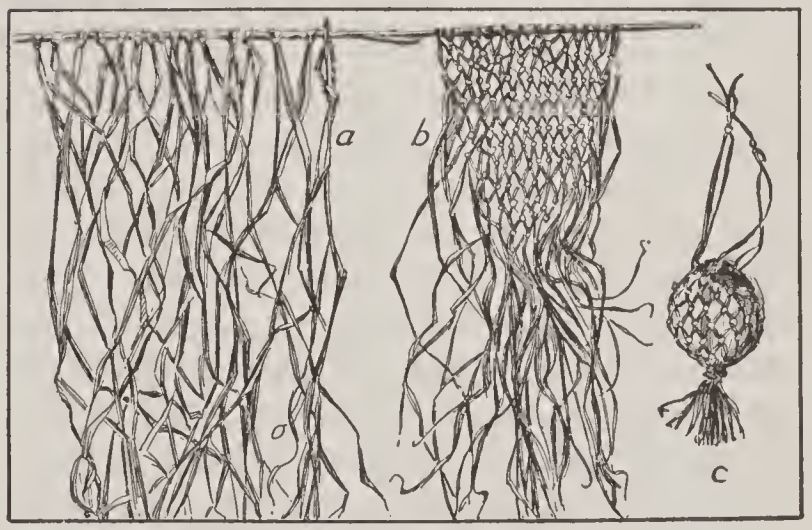


FIG. 1
Letters are explained in the text.

pretty and useful things which can be made of raffia alone. Much is said of the opportunities for originality in this work, but rather than let children work without a definite design in mind, it is better to furnish them with a plan or pattern. Only two elementary exercises are given here to indicate the possibilities of the work:

Exercise 1. To make a very useful holder for a ball of twine the only necessary articles are eighteen long, smooth strands of raffia; a pencil, or round, smooth stick, and a pair of scissors. Place the ends of one strand of raffia

together, thus making a loop at the center. Hold the stick horizontally in the left hand; then bring the loop over the top of the stick from the back, and pass the two ends up through the loop, pulling them down until the loop is held tightly against the stick (Fig. 1). In the same way loop the other seventeen strands on the stick (*a*). Now these strands must be knotted together. Beginning at the left, leave one strand hanging free. Knot the second and third strands. Hold the two strands together, bring the ends up and around to the back, across the back of the two strands and through the loop to the front; then pull the ends down into place. The knot should be about one-half inch from the pencil. Continue in the same way with the fourth and fifth

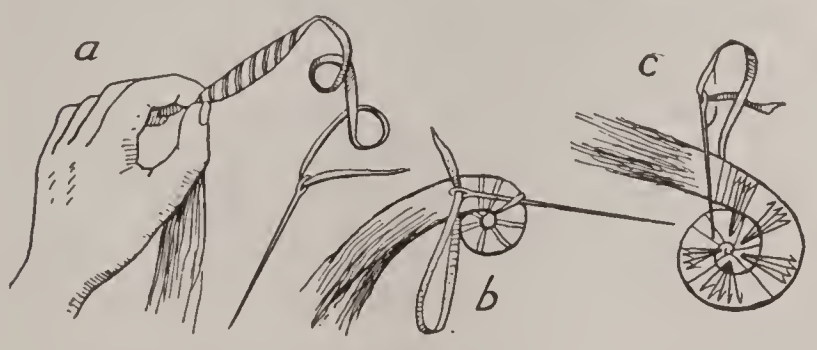


FIG. 2
Letters are explained in the text.

strands, the sixth and seventh, etc. One strand will thus be left hanging free on the right side, corresponding to the one on the left.

In knotting the second row, leave two strands free on each side. For each row of knots leave another strand free at each side until the knots form a V-shaped net. Now slip out the stick from the loops, and in its place pull through several strands of raffia braided together. Next knot together the first loose strand at the right with the first loose strand at the left; then the second pair, and so on until the loose strands are all knotted (*b*). Nothing remains now but to close up the bottom of the holder by tying it with a strand of raffia. Then cut the ends of the strands to a uniform length. The result is a useful and ornamental article (*c*). Similar bags may be made by knotting—for example, a workbag.

Exercise 2. To make a simple mat, first select ten to fifteen strands of raffia to form the rope or filling. Fig. 2 shows the processes. Coil the large end of the strands as illustrated (*a*), beginning about an inch from the end with a strand of raffia already threaded through a needle. Then turn the coil on itself, and put the needle directly through the coil and sew through the rope, as shown in (*b*). Then wind the rope with the threaded strand for about one-third or one-fourth of an inch; sew again through the rope. The stitches must be kept pointing toward the center, as in (*c*). The closer the stitches and the more tightly wound the coil, the stronger will be the mat. As the strands of the rope grow smaller, a few threads may be added at a time and wound carefully to conceal the ends. To finish the mat, let the coil of strands gradually thin out, so the end may be as inconspicuous as possible.

Such a mat may be used as the bottom of a basket. It may be varied by using colored strands in simple patterns. As the children grow older and more expert, more complicated patterns may be introduced, but even the youngest children in a school can use some pattern. W.F.Z.

Books devoted entirely to raffia weaving may be procured from any school supply house, at prices ranging from ten cents to fifty cents.

RAG'WEED, a garden weed which grows along roads, in fields, and in other waste places. It is from one to three feet high, with a coarse, fibrous stem; flat, many-sectioned leaves, and small, greenish, insignificant flowers. It is common throughout North America. *Roman wormwood* or *hogweed* is often called ragweed. The latter is found on river banks and grows to a considerable height, sometimes found as high as twelve feet, with three-lobed leaves. The pollen of the true ragweed is supposed to cause hay fever. English *ragwort* is also sometimes called ragweed. See HAY FEVER.

RAHWAY, *raw'way,* N. J., an attractive residential city of beautiful parks, handsome homes and clean streets, which many people engaged in business in the larger cities in the vicinity have made their home. It is in Union County, on the Rahway River, four miles from its mouth, and nineteen miles southwest of New York City by way of the Pennsylvania Railroad. Interurban lines communicate with cities and towns north and south. Rahway has a large trade in fruits and vegetables and in the products of its various manufacturing plants, which include steel works, carriage and automobile factories, steel and chemical works, and factories for making shirts, lace curtains and felt. The city has a good public school system and a library with about 20,000 volumes. In 1910 the population was 9,337; it had increased to 11,402 in 1920 (Federal census). The area exceeds four square miles.

RAIKES, *rayks,* ROBERT (1735-1811), the founder of one of the most influential religious

institutions of modern times—the Sunday school. He was born in Gloucester, England, where from 1757 to 1802 he published a newspaper called the *Journal*. Raikes was a pioneer in the movement to better the conditions of the jails, and his first Sunday school, opened in 1780, was designed to help the children of the poor. For the growth of this movement see SUNDAY SCHOOLS.

RAIL, a family of birds of many species, found distributed throughout the world. The rail is related to the crane, but is smaller in size. It is usually found in marshes, where its long toes enable it to run swiftly over the soft mud. These birds have short wings and tail and loose plumage of mingled brown and gray. When pursued, they seek safety by running and hiding, taking to flight only as a last resort and then flying heavily and soon dropping to cover. Rails build their nests of grasses on the ground. Their eggs number from seven to fifteen, and are usually buffy-white speckled with reddish-brown. They feed on worms, insects, shellfish, floating seeds and various plant sprouts. The rails most common in Europe are the *water rail* and the *corn crake,* or *land rail,* which frequents fields. In America are found the *king rail, yellow rail, clapper rail, Virginia rail, Sora rail* and others. Some of these species, especially the Sora, are much sought by hunters throughout their habitat.

THE YELLOW RAIL

RAILROAD, or RAILWAY. Half a century ago, when train traveling was still a novelty, John G. Saxe wrote his famous *Rhyme of the Rail*—

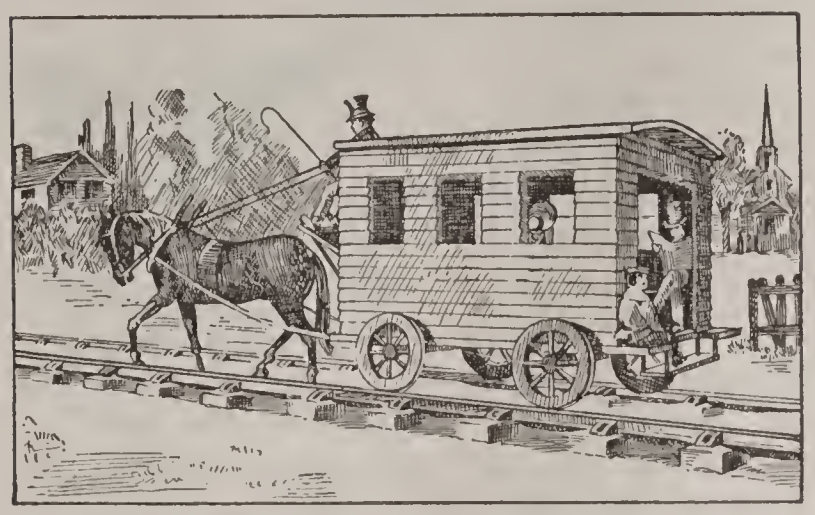
Singing through the forests,
Rattling over ridges,
Shooting under arches,
Rumbling over bridges,
Whizzing through the mountains,
Buzzing o'er the vale,—
Bless me! this is pleasant,
Riding on the Rail!

Poets to-day find riding on the rail too prosaic a theme for verses, but perhaps one of them will some day sing the song of what the railroad means in the daily lives of men.

It is profitable to reflect what the history of the United States and Canada would have been without the bands of steel which bind their parts together. It is realized that if a farmer does not live within a few miles of a railroad station it costs him more to haul grain to the freight car than to freight it half the way across the continent. If, then, there were no trains, only those farmers who lived near lakes or navigable rivers or canals could raise produce cheaply enough to sell it to the outside world at a profit, and few others would have any money to buy food, clothing and furniture. Most farming districts would have to be largely self-sustaining, producing not only food but also flax or cotton or wool for the homespun clothing, and timber for houses and furniture. Yet there are many miles of land now occupied which could not do this, as, for instance, the open prairies of North Dakota and Saskatchewan, where it is often miles between trees. Factories would be even more limited than farms, and most of the wonderful mineral wealth of the continent would lie untouched, for it would cost more than the value of the iron, copper or coal to bring those products to market. The people of one section of the country would be strangers to their fellow citizens of another; after a time it might be impossible to hold them all under one government.

Railroads and Governments. This intimate connection between railroads and the national life has long been recognized by statesmen. First came the understanding that railroads

were necessary to the development of a country, especially a new one, and governments either gave financial aid to construction companies or themselves undertook the task of building, in some cases operating the lines



AMERICA'S FIRST RAILWAY CAR
The Baltimore & Ohio horse car "Pioneer," in regular service between Baltimore and Ellicott City from 1829 to 1831.

which they owned, in other cases leasing them to corporations. Later came the realization that private companies, which because of their service to the public had received the privilege of *eminent domain* (the right to purchase any land necessary for their lines) and other favors, were under obligations to the public. From this view resulted the era of railroad regulation, and from it may come additional cases of government ownership.

Canada's Policies. The story of railways in the Dominion, which is given in detail in the article CANADA, is particularly interesting because it includes all these phases of national activity. It may be studied with profit by all who are interested in the questions of government ownership and control. Since 1876 Canada has owned and operated the Intercolonial Railway, built to bring together the maritime provinces and Quebec and Ontario. The line has never been financially profitable, but this is partly due to the fact that its route, for political reasons, was located as far as possible from the United States border. In 1915 the Dominion completed the National Transcontinental Railway, from Moncton, N. B., to Winnipeg, and because of the refusal of the Grand Trunk Pacific to take it over, now operates this as well. As the road traverses an undeveloped region far to the north it will probably be unprofitable for a time. The Hudson Bay road (see HUDSON BAY) may never pay directly, but increased prosperity resulting from additional shipments of wheat to Europe will more than make up the loss to the nation; this line, therefore, seems an instance in which government ownership is clearly necessary. The Ontario government road (see ONTARIO), like the National Transcontinental, is located in new territory.

No country has been more generous in aid to railroad builders than has Canada. The Canadian Pacific (constructed to secure British Columbia's entry into the Confederation), the Grand Trunk Pacific, the Canadian Northern and over 100 lesser lines have received land grants, actual cash subsidies, guarantees of their bonds and gifts of railroad constructed by the government. Provinces, too, and even municipalities have helped. Some claim that because of this lavish aid, Canada has more railroads than it can support. If this is true it will probably result in the government taking over the unprofitable lines through defaults of bond payments.

Regulation of railroads in Canada is the duty of a commission, which has power to fix rates, and also to compel the companies to build proper crossings, install switch tracks where they are needed, erect suitable stations and in every way deal justly with the public. The commission moves from place to place in the Dominion, to give hearings to local complaints.

United States. National ownership of railroads is as yet unknown in the United States, although the government has within the present century assumed the operation of lines in Panama, Alaska and the Philippines. The state of Georgia owns the Western & Atlantic Railroad, but intrusts its operation to a private company.

Encouragement to railroad building has been mostly in the form of land grants, and its story will be found in the article LANDS, PUBLIC, where there is also a map to illustrate it. National regulation of railroads is treated under the INTERSTATE COMMERCE ACT. The authority of the Federal government is limited by the Constitution to business which passes from state to state; intra-state business, that which is confined to one state, can be controlled only by the government of that state. Consequently, many of the affairs which in Canada are effectively administered by the Dominion's commission are in the United States handled by local bodies.

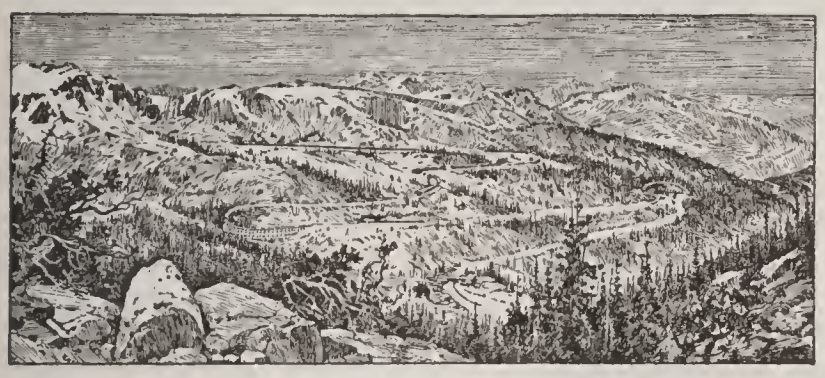
Other Countries. The two Americas are the only continents in which government railways do not exceed all others in length. Great Britain, Spain, Greece and Turkey own no lines, while Bulgaria and Serbia own all those within their borders. Some of the German roads be-

A PLEASURE RIDE ON AN EARLY AMERICAN TRAIN

A train on the Mohawk and Hudson Railroad, July 31, 1831, between Albany and Schenectady, New York, carrying politicians from the state capital on a tour of inspection. In spite of its clumsy appearance the engine was able to haul its load at a rate of thirty miles an hour on the level stretches, though when it entered the hills it had to be pulled up an inclined plane by a stationary engine. The cars were stage coaches. When the engine started they were jerked so violently by the loose couplings that "Whigs and Democrats embraced each other, or were thrown to the floor." Startled by the strange spectacle of the puffing monster, horses and even people ran in terror. The shower of pine sparks was so heavy that, on one occasion at least, a stop had to be made at a water tank to allow passengers to extinguish their burning clothes and umbrellas.

long to the imperial and some to subordinate governments, and, as in several other countries, many of the lines are leased to private companies. The larger South American states, Australia and New Zealand, Japan, Siam and nearly all European colonies own at least a part of their railroads.

America Versus Europe. The railroads of the Old and of the New World differ from each other as widely as the peoples. In Europe, where the first really successful steam railroad was opened in 1829, the increased facility of



DIFFICULTIES OVERCOME BY ENGINEERS

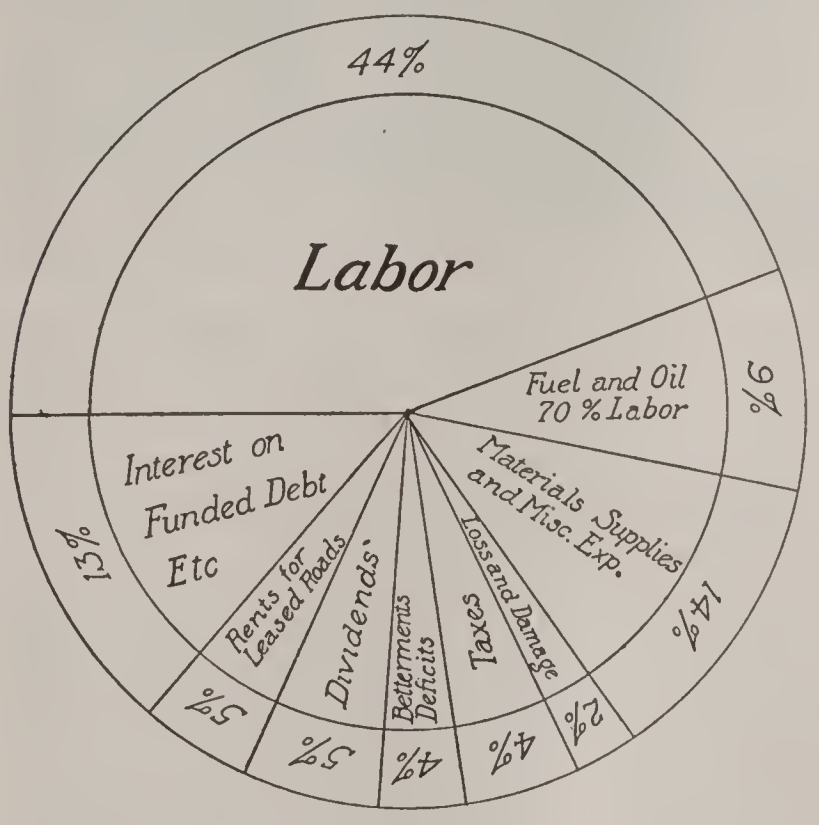
The illustration is from a photograph of a loop over the Rocky Mountains in Colorado.

transportation has served chiefly to bring together regions already populated, but in America it has made possible the rapid settlement of millions of square miles of previously untouched land. The early European builders had plenty of capital and were assured of ample revenue; their American contemporaries could obtain little money and knew that they must build up the territory they served before they attained earning power. As a result European roads were constructed more carefully, and without the sharp curves and heavy grades of American lines. American locomotives and cars had to be built to turn on these curves and to climb these grades, and since there were as yet no settled types of equipment (the first steam road in the United States was in operation in 1830, the first in Canada in 1832), a striking contrast developed between the appearance, size and strength of American and of European rolling stock.

A journey by train anywhere in Europe is a different experience from one in America. The ordinary type of European car is much lower and smaller than any American car, and is divided into compartments, in each of which from six to ten passengers are locked before the train starts. Each compartment is first, second, third or fourth class, according to the fare paid and the degree of comfort provided. Some railroads have adopted cars with a narrow passageway along one side, like that beside the smoking compartment in a Pullman car. Sleeping cars are all of this type; they accommodate only about half as many travelers as an American sleeper of the same length.

The nature of the freight which railways carry has had much to do with the evolution of their equipment. In America trains haul a large amount of raw material—coal, ores, wheat, cotton and so on—and large freight cars are the rule. Beside them the European cars, built to carry less bulky manufactured goods short distances, seem like toys. The average "goods wagon" in England can transport only ten tons, while the average freight car in the United States and Canada has a capacity of nearly forty tons. The larger loads require more powerful, hence heavier, locomotives, and though outside of America the largest locomotives weigh with their tenders but little more than 100 tons, engines in America weighing twice that amount are common and some of more than 400 tons have been built.

Modern Railroad Construction. Under the heading BRIDGE, on page 921, will be found a picture of the Tunkhannock Viaduct, a concrete structure 240 feet high and half a mile long, built to make possible a short cut of three and a half miles and the elimination of certain grades and curves. The cost of this bridge and cut-off was $12,000,000, so it is evident that the directors of the railroad believe they will save each year in operating costs at least half a



THE MONEY OF THE RAILROADS

The diagram shows for what the railroad spends the money it receives. The data relate to average years.

million dollars, the amount they will have to pay in interest on the money borrowed to build it. Anyone who has operated an automobile appreciates the fact that it requires as much power to turn a corner as it does to climb a slight hill. The steepest grade up which a locomotive can haul a load is one which rises but five feet in every hundred, and few roads have grades of more than one or two per cent, so it is plain that curves are quite as much to be avoided as grades.

Railroads in America are now being constructed with lower grades and more gradual curves than those existing on older lines. An excellent example of this is a comparison of the three Canadian transcontinental lines. On the Canadian Pacific, the oldest line, trains going either to or from the Pacific coast must climb some grades of 2.2 per cent. On the Grand Trunk Pacific, the youngest of the three, the heaviest grade resisting westbound traffic is 0.5 per cent, and no greater rise than 0.4 per cent opposes eastbound trains. The Canadian Northern has westbound grades of 1.0 per cent on stretches of line which were built some years ago, but on the new road through the mountains 0.5 is the maximum. Eastbound this same road has a few miles of 0.7 grade. The importance of the distinction between eastbound and westbound grades lies in the fact that on these roads the heaviest traffic moves toward the Atlantic.

The difference in sharpness of curves on the Canadian Pacific and on the Grand Trunk Pacific is as striking as that in grades. The former road has some curves of 10°, while the latter has none of more than 6°. By a curve of 10° is meant one in which the line between two points 100 feet apart in a straight line is an arc of 10°, or $\frac{1}{36}$ the circumference of a circle. A 6° curve is therefore part of a much larger circle, for a chord of 100 feet marks only $\frac{1}{60}$ of the 360° in the circumference. Were a Canadian Pacific maximum curve a little more than 3,600 feet long a train would turn completely around, but on the other railroad the curve would have to be over 6,000 feet in length for the same thing to happen.

The first steps toward building a railroad are the surveys. The first survey (which is unnecessary if accurate profile maps of the region exist) is to determine what route will serve the most profitable territory at the least expense of construction and operation; when the decision is made the surveyors mark out the route, indicating by stakes exactly where the line is to run. The grade is then prepared and bridges are built, material is taken from *cuts* and so far as possible turned into *fills*. On many lines the *ties* and *rails* are put down by a tracklaying machine, which can finish two or three miles of track in a day. Ties, or sleepers, are as a rule rough-hewn timbers about nine feet long, six inches thick and ten inches wide, set across the track at intervals of two feet or less. On them rest the rails, which are commonly thirty feet long, and for first-class American railroads weigh ninety pounds or more to the yard. *Ballast* consists of crushed stone, gravel, slag, cinders or other material inserted beneath and between the ties to keep them in their proper place and to cushion the roadbed.

Almost all the railroads of the United States, Canada and England are constructed according to *standard gauge,* with their rails four feet, eight and one-half inches apart. *Narrow-gauge* roads are seldom found except in the mountains. In other countries there are gauges of all widths up to six feet, so it is frequently impossible for the cars of one railroad to travel

THE STORY OF TRAVEL

Pack train of prehistoric man

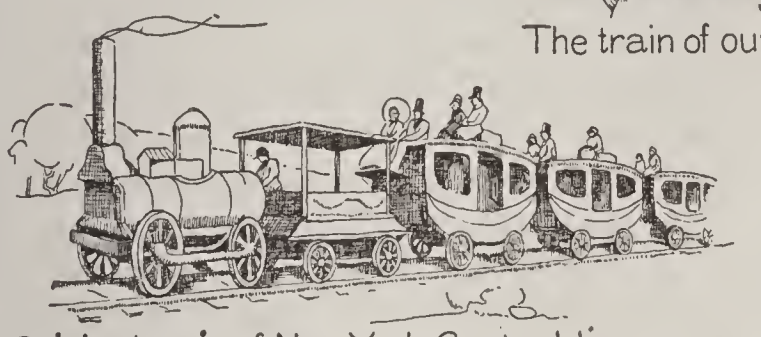
Dog sledge
The train of the snowfields

Pony express
The train of the savage

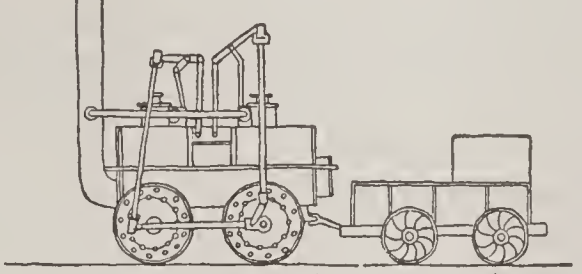
Ox-cart
The train of the pioneer

Stage coach
The train of our forefathers

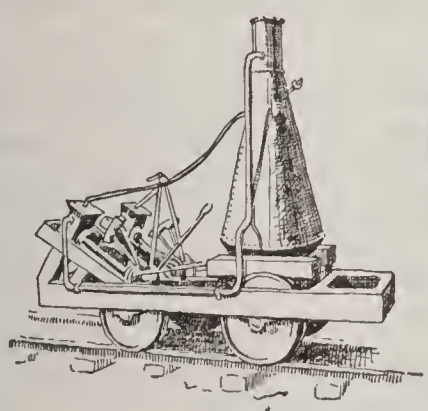
Horse locomotive



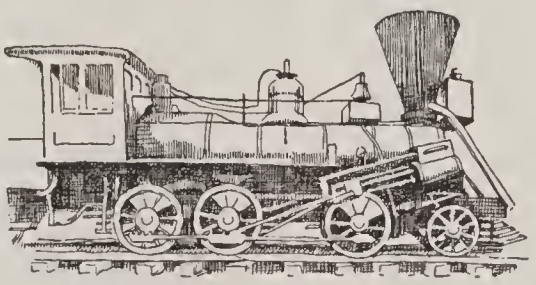
Original train of New York Central lines
1831



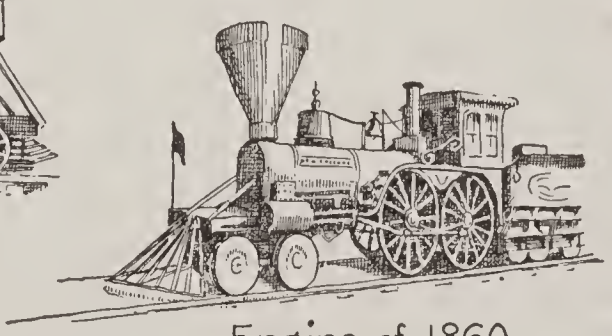
Stephenson's first locomotive
1825



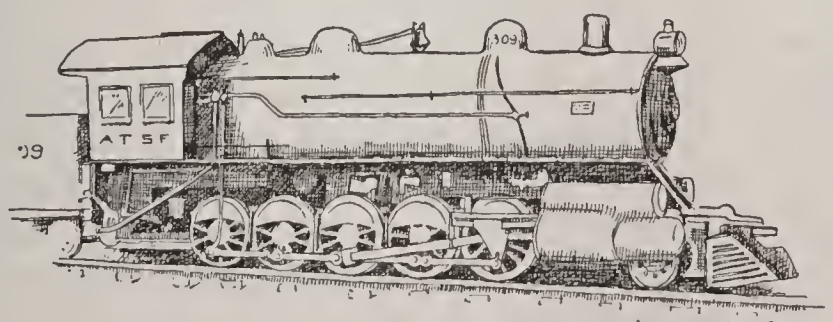
James engine
1832



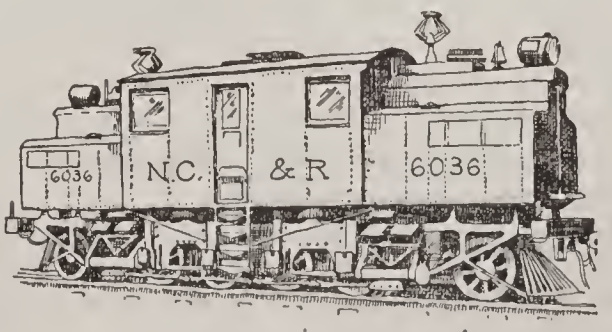
Baldwin locomotive
1853



Engine of 1860



Type of heavy freight locomotive 1916



Electric locomotive
1917

on the tracks of another. Many fantastic stories are told to explain how four feet, eight and one-half inches came to be the standard gauge, but the most plausible explanation is that early cars measured five feet from outside of wheel to outside of wheel, each wheel being an inch and three-quarters thick.

Early Railroads. The railway had its beginnings in the coal mines of England, where for several centuries timbers were laid lengthwise for the wheels of the carts to run on. Later the timbers were covered with iron, and before the nineteenth century were replaced by cast-iron rails. The first railroad of this kind in America was that built at Quincy, Mass., in 1826, to carry stones for the Bunker Hill Monument. The first locomotive to run on a railroad was put in operation near Cardiff, Wales, in 1804, but it soon broke the rails. Others succeeded it, however, and in 1825 a regular passenger service was established on the Stockton & Darlington line, in England. The Baltimore & Ohio, chartered in 1827, was the first one in the world built to be a common carrier, but it did not adopt steam engines until after another American line, the South Carolina Railroad, had done so in 1830.

Some Figures. Below are the statistics of the leading railroad nations, considered in three different ways:

Greatest Total Mileage.

United States	265,000
Russia	50,000
Germany	40,000
British India	35,000
France	32,000

Mileage per 10,000 Inhabitants.

Australia	41.3
Canada	38.1
Argentina	27.2
New Zealand	27.1
United States	25.9

Mileage per 1,000 Square Miles.

Belgium	479.3
Luxemburg	326.7
Switzerland	223.3
Great Britain	195.4
Germany	189.7

Consult Crandall and Barnes' *Railroad Construction;* Haney's *Congressional History of Railways.*

Related Subjects. The reader who wishes further information on certain phases of the general subject of railroads is referred to the following articles in these volumes

Cape-to-Cairo Railway
Common Carrier
Electric Railway
Eminent Domain
Interstate Commerce Act
Locomotive
Monorail, Suspended
Municipal Ownership
Railroads, Transcontinental
Transportation
Trans-Siberian Railway

The subhead *Transportation* in the articles on the various countries, states and provinces may also be consulted.

RAILROADS, Transcontinental, a term frequently used to distinguish the great systems that traverse North America from the region of the Mississippi River to the Pacific coast. When engineers undertook the first surveys to find passes through the mountains, the country was a wilderness between Missouri and California. The difficulties were twofold—physical and financial—and they were enormous. In no department of its industrial life has America produced men of finer minds or of keener constructive vision than the pioneer builders of its railroads. They literally created a civilization where the Indian and the prairie dog alone had flourished.

The discovery of gold in California gave an impetus to projects for rail lines to the western coast. As early as 1853 Congress ordered surveys, but private capital was not eager to risk itself in a venture so dubious as that of building a railroad through thousands of miles of uninhabited country. Moreover, the financial crisis of 1857 and the outbreak of the War of Secession interrupted for a time industrial progress. Finally the government came to the assistance of investors with generous gifts of the public land; it further engaged to pay the interest on the bonds should the company be unable to do so. With this encouragement, the Central Pacific was pushed from Omaha to San Francisco, being opened to traffic in 1869. This was a kind of substitute for the Northwest Passage, sought by navigators for four centuries.

Railway construction was immensely stimulated in the Northwestern states after the country had weathered the crisis of 1873, and several years later the scene of activity was transferred to the southwestern and Rocky Mountain region. The Santa Fe was pushed courageously across a desert, and the building of all the early lines was accomplished at the cost of much hardship and no little actual peril from savage men and savage beasts. Naturally rail development progressed more slowly in Canada, as a result of the vastly smaller population. The Canadian Pacific, from Montreal to Vancouver, was completed with the aid of the government in 1886. It now extends from Saint John, on the Bay of Fundy, and from Quebec, on the Saint Lawrence River, to Vancouver. Its length is about 3,380 miles. The Grand Trunk Pacific and the Canadian Northern are

other great transcontinental Canadian lines (see CANADA, subtitle *Transportation*).

The Atchison, Topeka & Santa Fe, stretching from Chicago to San Francisco and traversing Kansas, Colorado, New Mexico and Arizona, had in 1914 a total of 11,320 miles of track; while the great Hill lines, the Northern Pacific and the Great Northern, extending from Saint Paul and Duluth to Portland and Seattle respectively, possessed nearly 6,000 miles of track each. The other transcontinental lines in the United States are the Union Pacific; the Southern Pacific; the Chicago, Milwaukee & Puget Sound, which was deeded to the Chicago, Milwaukee & Saint Paul in 1912; and the system formed by the Wabash, the Missouri Pacific, the Western Pacific and the Denver & Rio Grande, which runs from Denver, Colo., to San Francisco. See RAILROAD.

RAILROADS OF CANADA. See article CANADA, subtitle *Transportation.*

RAIN. Shakespeare, in *The Merchant of Venice,* has a beautiful description of the quality of mercy, which he says is like the "gentle rain from heaven." Probably no phenomenon in nature has received more grateful tributes than the fall of rain, because upon it depend the comfort and happiness of mankind. This idea is expressed picturesquely in these lines of an old poem:

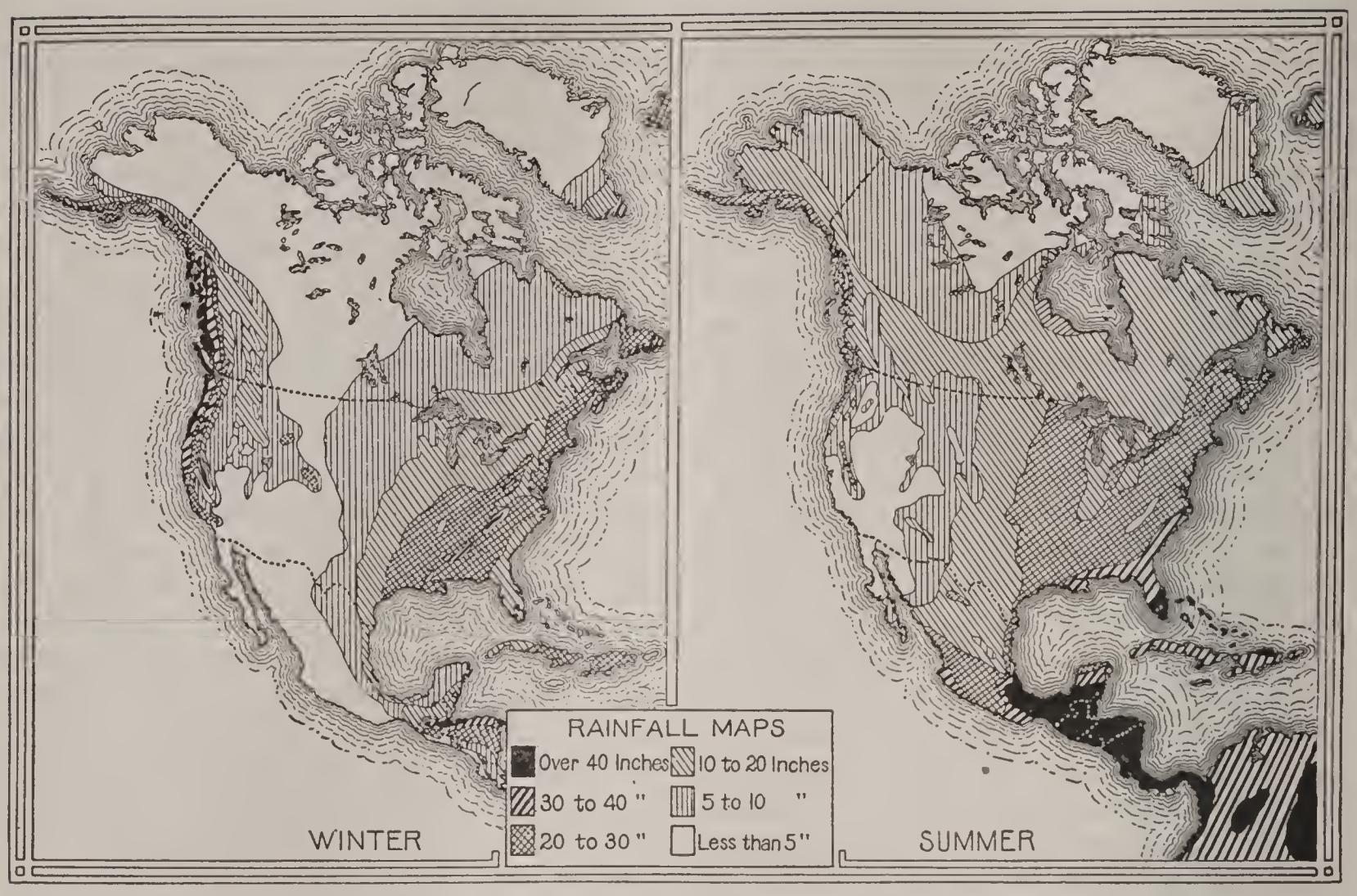
The pastures lie baked, and the furrow is bare.
  The wells they yawn empty and dry;
But a rushing of waters is heard in the air,
  And a rainbow leaps out in the sky.
Hark! the heavy drops pelting the sycamore leaves,
How they wash the wide pavement, and sweep from the eaves.

And deep in the fir-wood below, near the plain,
  A single thrush pipes full and sweet,
How days of clear shining will come after rain,
  Waving meadows, and thick-growing wheat;
So the voice of Hope sings, at the heart of our fears,
Of the harvest that springs from a great nation's tears:
  O, the rain, the plentiful rain!

What Is Rain? A child asked this question would probably say that rain is water that falls out of clouds in drops. Such an answer would be correct, though it does not explain why the clouds form or why they lose their moisture. The formation of rain depends upon several interesting processes in nature. Moisture is constantly being taken up into the air from the earth's surface, particularly the warmer parts of the ocean, by a process called *evaporation.* This moisture, called water vapor, is invisible; it is mingled with the other gases in the air and is carried about by the winds. When the moisture-laden air is cooled to a certain point the vapor it contains condenses into tiny particles of water so fine that they might be called *water dust.* This water dust is known as cloud or fog, according to whether it is high in the air or near or at the surface of the earth. A further cooling of the air will cause the minute cloud particles to condense and unite into drops so large and heavy that they fall by their own weight. Floating dust motes in the air have something to do with rain formation, for these tiny dust particles form lodging places for the condensing vapor, and, because they cool more rapidly than the air, they hasten the condensing process. The essential condition, however, is the reduction of the temperature to a point where the air can no longer hold the moisture it contains. When the air contains all the vapor that it can hold at a certain temperature it is said to be *saturated,* or at the *dew point.* Rain occurs when the temperature falls below the dew point.

Raindrops and Their Work. Probably every one has observed that raindrops vary greatly in size and in the swiftness with which they descend to the earth. The largest drops that have been measured were about one-fourth of an inch in diameter and traveled at the rate of from fifteen to twenty-five feet a second. The smallest drops measured were not more than one-twentieth of an inch in diameter and fell at a much slower rate, probably about five feet a second. Raindrops, in falling, wash all sorts of impurities out of the air—dust, soot, pollen from plants, and many other solid substances. It has been calculated that a five days' rain in London, England, which is a very smoky, dirty city, will wash from the air 3,738 tons of solid impurities, including 267 tons of sulphate of ammonia and 2,000 tons of soot and other suspended matter.

Why and Where Rainfall Varies. It has already been stated that a great amount of moisture is evaporation from the warmer parts of the ocean. Consequently tropical regions have, in general, a very heavy rainfall. A yearly average of 100 inches of rain might be given for the tropics, one-third as much for the temperate zones, and one-eighth as much for the polar regions. The actual variation, however, is far greater than this. The highest rainfall ever recorded for one year was 805 inches, in Assam, India; the lowest was three one-hundredths of an inch, in Walfish Bay, on the west coast of



NORTH AMERICAN RAINFALL, SUMMER AND WINTER

Africa. These variations are due to a number of causes, the principal ones being the height of a given region above the sea, its distance away from the sea, and the character of the land, whether barren or wooded. On slopes that are exposed to ocean winds rainfall is generally abundant, while regions shut off from the sea by high mountain ranges are almost rainless.

Lands That Always Have Rains. The southern slopes of the Himalaya Mountains in India have the heaviest rainfall in the world, from 200 to 600 inches a year, because the warm winds from the Indian Ocean, heavily laden with moisture, lose nearly all of it when they strike the cool mountain slopes. These mountains are very high, and on their northern slopes the annual rainfall is less than ten inches, because practically no moisture is carried across their tops. The vast Amazon region in South America, because it is heavily wooded and does not become superheated as does a barren region, has an abundant rainfall; the winds which mount the eastern slopes of the Andes still have moisture to give up, but they cannot cross the towering peaks, therefore the western slopes of these same mountains are practically desert. The winds blowing from the ocean, on the other hand, are too cold to bring rain.

Desert Lands. The Sahara Desert is an example of a rainless region. As it is situated in the tropics and is surrounded on all sides by warm ocean waters, an abundant rainfall might be expected. Yet it is one of the driest regions in the world. The lack of rain is due in part to the fact that the region is well surrounded by mountains, on whose slopes the ocean winds lose most of their moisture. On striking the sandy area, the air is heated still further instead of being cooled, and, consequently, clouds cannot form nor can any rain fall. Similar deserts are found in the southwestern part of the United States, and in Western Australia. There are desert table-lands, too, particularly in west-central Asia, which, because of their altitude, are almost as rainless as the polar regions. California illustrates perfectly the effect of the changing seasons on the rainfall of a coast country near the tropics, where alternating wet and dry seasons are the rule. During the summer months the ocean breezes are heated when they strike the land and do not give up their moisture, but during the winter months they are cooled and almost daily rainfall results. The maps illustrating the distribution of rainfall over the world and the maps illustrating the prevailing winds of the world and the ocean currents, if studied together, should be very helpful.

Life Follows Rain. Practically all forms of plant life depend on rain. Where the rainfall is abundant, the land is covered with vegetation; where there is no rain the land is barren. And it follows, logically, that where plant life is abundant, there animal life is abundant. It is one of the triumphs of civilization that it can modify this law, for the deserts of the world are being conquered to-day as never before and made into the garden spots of the earth through irrigation. A.C.

Consult Henry's "Rainfall in the United States," in *Weather Bureau Bulletin D.*

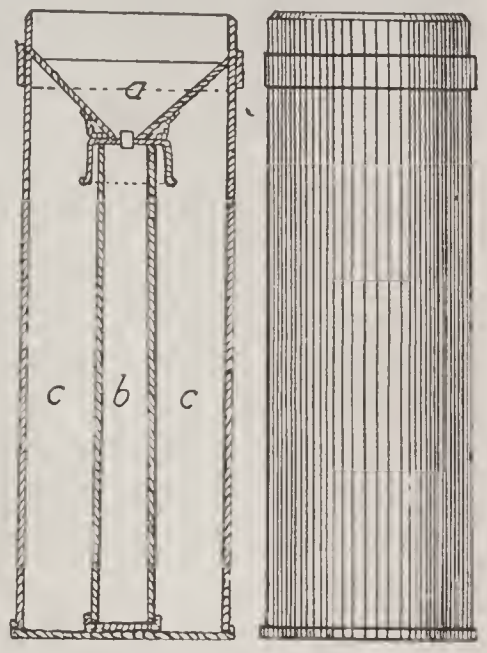
Related Subjects. The reader is referred to the following articles in these volumes in connection with this discussion of rain:

Climate, subhead *Rainfall*	Humidity
Cloud	Irrigation
Desert	Lightning
Dew	Meteorology
Dust, Atmospheric	Rainbow
Evaporation	Rain Gauge
Flood	Snow
Fog	Storms
Hail	Weather Bureau
	Wind

RAINBOW, *rain'bo.* Often when the sun shines and there is a shower of rain we see in that part of the heavens opposite the sun an arch of beautiful colors. If the rain is of sufficient extent the bow spans the entire arc of the sky and its two ends seem to rest on the earth below. The cause of this interesting natural phenomenon is the reflection and refraction of the sun's rays as they fall on drops of rain. Sunlight, or white light, we know, is a combination of seven colors—violet, indigo, blue, green, yellow, orange, red (see LIGHT, subhead *The Spectrum;* COLOR). As a ray from the sun passes into a drop of rain the latter acts like a tiny prism; the ray is bent, or refracted, as it enters the drop, and is dispersed or separated into different colors. On striking the inner surface of the drop it is reflected, or turned back, and on leaving the drop is further refracted and dispersed. What we see in the heavens is a beautiful natural spectrum, produced by successive drops. Each color is formed by rays that reach the eye at a certain angle, and the angle for a particular color never changes.

A complete bow shows two bands of colors, the inner and brighter one being called the *primary* bow, and the outer and less distinct, the *secondary* bow. The primary bow has the red on the outside and the violet on the inside of the arch, while in the secondary bow the colors are reversed. In the secondary bow there are two reflections within the drop. The higher the sun, the lower the bow, and if the sun is higher than forty degrees, no bow is visible. When the sun is near the horizon, an observer on a high mountain or in a balloon might see the whole circle of the rainbow. Rainbows are often observed in the spray that flies from a cataract. Very beautiful ones may be seen on sunny days at Niagara Falls.

RAIN GAUGE, *gayj,* an instrument for collecting and measuring rain. There are numerous patterns of these instruments, but the simple rain guage in use by the United States Weather Bureau is the most easily understood and operated. In shape it resembles a cylindrical pill box with a removable cover (see drawing). Inside is a smaller tube (*b*) which widens into a funnel (*a*) at the top. As the area of the funnel is ten times that of the tube, one-tenth of an inch of water falling into *a* fills *b* to a depth of one inch. When the tube is full the surplus water overflows into the reservoir (*c*). With a rule divided into inches and tenths of inches instead of halves, quarters and eighths, the water in the tube *b* is measured. In case the fall of rain is so heavy that the water overflows into *c,* the water in *b* is poured out after measuring, and that in *c* is poured into the tube and measured. The sum of the two measurements is the amount of rainfall. The gauge should be set far enough away from buildings, trees or other tall objects to prevent any obstruction of the rain.



RAIN GAUGE
Explanation appears in the text.

A gauge placed near the ground shows a greater fall of rain than one at a height, because the drops passing a greater distance through the air collect more moisture. Therefore, if the rainfall at two places is to be compared, the gauges must be placed at similar heights.

RAINIER, *ra neer',* MOUNT, a peak of volcanic origin, the highest in the state of Washington, called *Mount Rainier* in a good-natured spirit of rivalry by the residents of Seattle and

Mount Tacoma by those of Tacoma. It is situated in Mount Rainier National Park. The mountain, which is one of the noteworthy sight-seeing places of the Northwest, is reached by automobile and stage lines, but the last part of the road is not always open to traffic. Trails leading to it wind through splendid fir and cedar forests, past mountain torrents, and among patches of scarlet heather and white

MOUNT RAINIER
Fog is seen hanging below the mountain top.

glacier lilies. The peak itself is 14,408 feet above sea level, but travelers usually ascend to the end of the timber line, a height of about 9,000 feet, by way of lesser peaks. At this point on the south side of the peak are hotel accommodations, and there such unique pastimes as summer snowballing and coasting may be enjoyed.

From that point the ascent of the peak itself is made, a trip which can be accomplished within two days. The climb is a steep and dangerous one, and should be made only with skilled guides. The way is beset with blind crevasses, steep ice precipices and crumbling lava beds. Nisqually Glacier, which is part of one of the largest glacier systems in the world, lies at the foot of the mountain.

RAINY LAKE, a picturesque lake lying on the boundary between Ontario and Minnesota. Its southern end is about 125 miles north of Duluth, Minn., and about 150 miles west of the shore of Lake Superior. The lake is shaped roughly like a capital L, each arm being approximately forty miles long and from three to eight miles wide. Its surface, though covering an area of more than 300 square miles, is so broken by hundreds of islands that the largest stretch of open water is hardly more than a mile wide. The shores are rocky and are lined with spruce, pine and other cone bearers, which are being cut to supply the mills of Fort Francis, Ont., and other towns on the lake. The Canadian Northern Railway crosses the lake almost at its center. Fish are plentiful, especially pike and pickerel, but whitefish is the only variety of commercial importance. The Rainy Lake region is noted not only for fishing, but also for bears, moose and other wild game. The surplus waters of the lake are carried by the Rainy River westward to the Lake of the Woods.

RAISIN RIVER, Massacre of, an atrocious deed committed at Frenchtown (now Monroe, Mich.) in January, 1813, during the War of 1812. A detachment of Kentucky troops, that had been sent to drive the British from Frenchtown, on the Raisin River, were captured by Proctor, who had advanced from Canada with a body of 1,500 British and Indians. After the battle, Proctor returned to Fort Malden with the able-bodied American prisoners, leaving in the town all the wounded. As soon as the British left, the Indians massacred the prisoners. "Remember the River Raisin" was long afterwards used as a battle cry by American troops.

RAISINS, *ra'z'nz,* the name given to dried grapes, which have been a table luxury for many hundred years. They have always been produced in large quantities in the countries around the Mediterranean Sea, the finest table

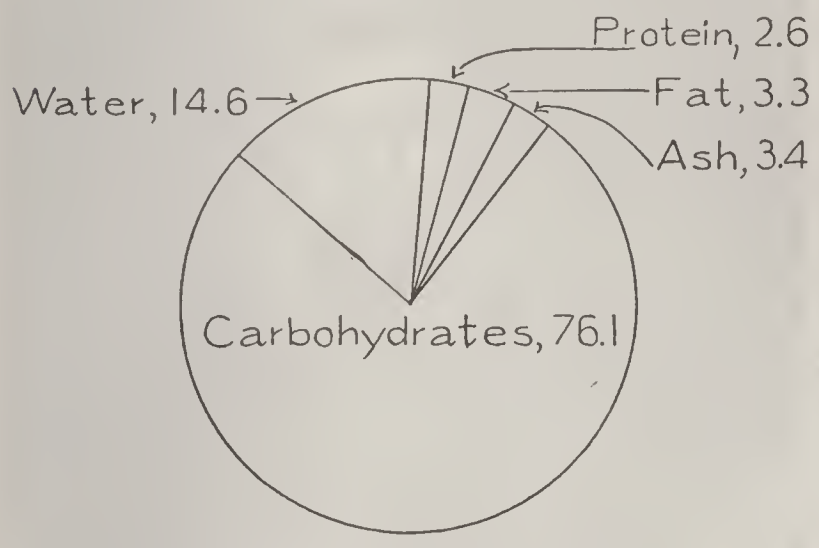
GRAPES AND RAISINS

and cluster raisins formerly coming from Spain, and the small seedless, yellow raisins from the vicinity of Smyrna, in Turkey. In the Middle Ages large quantities of raisins were imported from Spain into England, where they were regarded as a great delicacy. To-day California furnishes raisins of as fine quality as any other section of the world; it produces a sufficient quantity for the entire country and for Canada. Spain can send no finer cluster raisins than the Malagas and Muscatels of California, and Smyrna can produce no sweeter Sultanas.

California raisins began to be important in 1874. In that year 9,000 boxes, or about 180,000

pounds, were produced. By 1894 the crop amounted to more than 100,000,000 pounds. The supply was so much greater than the demand that the market "broke," and raisins sold for less than two cents a pound. Immediately the fruit growers cut down their output, for they could not afford to produce more raisins than people would buy at a reasonable price. The supply has been controlled ever since by a Raisin Growers' Association, which manages very successfully to stimulate the market and to distribute the crop.

How Raisins Are Prepared. The finest raisins are made from grapes containing a large amount of sugar, and they are always sun dried. Sometimes the bunches of grapes are simply cut partly through at the stem to stop the supply



COMPOSITION OF RAISINS

of sap and then are left hanging on the vines to dry. Usually, however, they are picked and spread out in shallow trays in the hot sun. They are turned from time to time by simply placing an empty tray top side down on a full one and then turning both over and taking off the top tray. From ten to thirty days are required, depending on the weather and the condition of the grapes, before the raisins are considered "cured." After they are dried they are stored in great bins called "sweat boxes" until they can be sorted, weighed, packed and shipped.

Almost every operation is now performed by machinery. The first machine was one for seeding raisins; the latest is one which fills, weighs and seals the packages of dried fruit. The finest raisins are dried in clusters just as they come off the vine and carefully packed for table use. Loose raisins are packed in large boxes, or are seeded and put up in sealed paper cartons, the average market price being fifteen cents a pound. There was a movement in 1917 to set apart a special day of each year on which people throughout the United States should eat raisins. "Raisin Day" advocates hope thereby to stimulate the raisin trade.

Raisins have, on an average, a carbohydrate (starch and sugar) content of 76.1 per cent and a fuel value of 1,445 calories (see CALORIE) per pound. They are wholesome and nutritious and are served in numerous ways. Nuts and uncooked raisins are a pleasing form of dessert, and raisins are also extensively used in the preparation of boiled rice, puddings, bread, cookies and other forms of pastry. See FOOD, subhead *Chemistry of Food.*

Consult Eisen's *The Raisin Industry;* Husmann's *Grape, Raisin and Wine Production in the United States.*

RAJAH, *rah'ja,* a Hindu title derived from a Sanskrit word meaning *king.* It was originally given to princes who ruled over the native states of India, but has been also conferred on Hindu subjects of high rank by the British government. Each native prince, or rajah, has his own small army, but a British officer, called a *resident,* who lives near the court, watches the administration of the government, and gives reports to the Viceroy of India. As a rule the native princes now also assume the title *maharajah,* meaning *great king.*

RAJPUTANA, *rahj poo tah'na,* a political division in the north-central part of India, known officially as RAJPUTANA AGENCY. It embraces twenty-one native states, which surround the British province of Ajmer-Merwara. The area is 128,987 square miles; the population was 9,857,012 in 1921. Most of the inhabitants are Hindus, but there are nearly one million of the Mohammedan faith. The Europeans number about 1,200. Much of the country is rocky or desert land, but there are fertile sections in the southeastern part, and there the people grow millet, wheat, barley, sesame, corn, rice, cotton, hemp, tobacco and indigo. The raising of camels, cattle and sheep is the chief industry in the northwestern section, where soil and climate are unfavorable to agricultural pursuits. These sections are two distinct physical divisions of Rajputana, and are separated by the Aravalli Hills. The highest point of this range, Mount Abu, is 5,650 feet above the sea; it is the loftiest elevation between the Himalaya Mountains and Nilgiri Hills, in the southern part of the Indian peninsula. Of the several rivers which drain the southeastern section of Rajputana, the largest is the Chambal. See INDIA.

RALEIGH, *raw'li,* N. C., the capital of the state and the county seat of Wake County,

situated a little northeast of the geographical center of the state. Wilmington is 135 miles southeast; Richmond, Va., is 158 miles northeast, and Atlanta, Ga., is 420 miles southwest. The railroads entering the city are the Southern, the Seaboard Air Line and the Norfolk Southern. The site of Raleigh, originally known as Wake Courthouse, was chosen for the capital in 1792, and in the same year it was founded and named in honor of Sir Walter Raleigh, the English explorer. In 1794 the legislature met here for the first time. It was incorporated in 1795 and again in 1803, and in 1899 the city charter was granted. Since 1912 the city has been governed on the commission plan, and its public property and highways are owned by the state. The population increased from 19,218 in 1910 to 24,418 in 1920 (Federal census); about thirty-three per cent of the inhabitants are negroes. By extending the city limits in 1907, the area was almost doubled; it now covers four square miles.

Union Square, an open space covering four acres, occupies the center of the city, and from it radiate four streets (100 feet wide) which divide the city into four sections. This square contains the massive granite Capitol, and the number of magnificent oak trees surrounding it has given Raleigh the local name of *The City of Oaks*. A number of the state institutions are located in the city—the administration building, governor's mansion, insane asylum, penitentiary, institutions for the blind and deaf and dumb, the supreme court, college of agriculture and mechanic arts, the state library and the experimental farm. Besides these, the city has a $500,000 Federal building, the county courthouse, the Municipal Auditorium, with a seating capacity of 5,000, Raney Library, Methodist and Roman Catholic orphanages, and Rex, Saint Agnes and Leonard hospitals.

Raleigh offers exceptional educational advantages, having, besides the public schools and state institutions of learning, Saint Mary's, Peace and Meredith colleges for women; Shaw University (Baptist); Raleigh Male Academy; and Saint Augustine's School for boys and girls (Protestant Episcopal). Raleigh was the birthplace of Andrew Johnson, seventeenth President of the United States, and his home, which has been removed to Pullen Park, is an interesting feature of the city. There are Confederate and National cemeteries here. Cotton and leaf tobacco are the principal articles of trade, and the making of cotton and of tobacco products are the leading industries of the city. There were 83 factories in 1920, capitalized at $5,029,000. The value of the products that year was $6,871,000. A.T.B.

RALEIGH, Sir Walter (about 1552-1618), navigator and historian, a gallant courtier so familiar as a type of the elegant and clever gentleman that we almost forget he lived three hundred years ago. Tall, handsome and eager

SIR WALTER RALEIGH
Reproduced from an old painting.

to please, he once spread his richly-embroidered cloak so that Queen Elizabeth need not step in the mud. She liked him very much for that splendid act of courtesy, and in time he became one of her favorite courtiers.

When a young boy, Raleigh attended Oxford University but left before graduating to join a band of gentlemen volunteers on their way to France to help the Huguenots (see Huguenots). When he returned to England he found his half-brother, Sir Humphrey Gilbert, about to embark on a voyage of discovery and privateering to America. He joined the party, which was forced to return without success. He then became a captain in the

army in Ireland. At one time the young man was sent to the English court with dispatches, and he became a great favorite with Queen Elizabeth, who knighted him in 1584. He became wealthy through grants of lands and certain monopolies given him by the queen. Upon one visit to Ireland, Raleigh discovered the genius of Edmund Spenser, whom he brought to England; later three books of the *Fairie Queene* were dedicated to Queen Elizabeth.

Raleigh was intensely interested in discovery, and although the queen would not permit him to leave England, he obtained privileges and sent several expeditions between 1584 and 1589, which were not immediately successful. The place where they attempted to settle was called *Virginia,* in honor of the Virgin Queen. Potato and tobacco plants were taken to England from the new Virginia, so to Raleigh is given the credit for the introduction of tobacco into Europe. The potato had already become known to some extent in Spain.

Spain was England's greatest enemy in those days. Raleigh had some part in the victory over the Spanish Armada in 1588, and immediately after was busy helping to prepare ships which could go against Spain. At this time he incurred the queen's displeasure because of his love for one of her maids of honor, Elizabeth Throgmorton, whom he was permitted to marry; but thereafter was denied the privilege of appearing in the royal court. So Raleigh was free to explore, and soon he sailed for America. On the island of Trinidad he found a lake of bubbling pitch, now world-famed as asphalt, with which he filled the leaking seams of his vessels. He captured the town of San Josef and explored the Orinoco River.

Before the queen's death Raleigh was partly restored to favor, but James I distrusted him, and had him imprisoned in the Tower of London for thirteen years, where he lived comfortably with his family and servants. It was during this imprisonment that he wrote his *History of the World,* which up to that time was the best English history that had been written. Raleigh was released from the Tower to lead another expedition to South America for gold. His party, unfortunately, attacked the Spanish, and upon his return to England he was beheaded upon the demand of Spain. M.W.

Consult Marshall's *Sir Walter Raleigh;* Sélincourt's *Great Raleigh.*

RAMAYANA, *rah mah' ya'na,* a great epic poem of India containing 24,000 verses, second in length to the *Mahabharata,* which it surpasses in interest. Unlike the longer poem, it was written almost entirely by one author, the poet Valmiki, who is supposed to have lived about the beginning of the Christian era. The poem tells in detail the history of Rama, son of Dasaratha, king of Oudh, and his successful conflict with Ravana, king of demons, who dwelt in Lanka. Lanka has been identified with Ceylon. See MAHABHARATA.

RAMÉE, *ra may',* LOUISA DE LA (1839-1908), an English novelist born in Bury Saint Edmunds, more familiarly known by her pen name, OUIDA. The latter had been her childish way of pronouncing "Louisa." Her first novel, *Held in Bondage,* appeared in the London *New Monthly Magazine* in 1863. Many others followed, and for a time she was widely popular. Her stories reveal a gift for picturesque description and a sense of the dramatic, but they are often cheaply sensational and over-sentimental. She is at her best in writing of Italian peasant life and in descriptions of dogs, of which she was very fond. One of her children's stories, *The Nürnberg Stove,* has genuine literary merit. Her books include *Under Two Flags, A Dog of Flanders, Two Little Wooden Shoes* and *Bimbi.* Though Ouida's writings brought her a fortune, she died in comparative poverty.

RAMESES II, *ram' a seez* (reigned 1340-1273 B. C.), one of the most famous of the Pharaohs, and the greatest of the twelve rulers called Rameses. Until recently he was supposed to be the Pharaoh who oppressed the

TOMB OF RAMESES II

Four colossal figures of the ruler, forming the façade of the temple at Ipsambul. Between the feet are life-size figures of his queen Nefretere.

Children of Israel, but this is now considered improbable (see EGYPT, subtitle *History of Egypt*). He ascended the throne of Egypt when very young, and reigned sixty-seven years. During the earlier part of his reign

he conquered Ethiopia and sought to overcome the Hittites. At the age of twenty-one he formed an offensive and defensive alliance with the Hittites, marrying the daughter of their king as an evidence of good faith. The latter part of his reign was peaceful. In 1881, sections of a colossal statue of Rameses II were found near Memphis. The mummy of the king was discovered in 1881 near Thebes, and several years later it was removed to the museum at Cairo. See PHARAOH.

Consult Wallace-Budge's *A History of Egypt;* Breasted's *Ancient Records of Egypt.*

RAMIE, *ram'i.* See BOEHMERIA.

RAMSAY, *ram'zi,* DAVID (1749-1815), an American historian and statesman, was born in Lancaster County, Pa. He graduated at Princeton, and, after studying medicine at the University of Pennsylvania, moved to Charleston, S. C., where as a physician, writer and advocate of colonial rights he rendered services of exceptional value. While acting as a surgeon in the Revolution, he was taken as a hostage after the capture of Charleston in 1780, and confined for eleven months at Saint Augustine. A member of the Continental Congress from 1782 to 1786, he was its president during the last two years of this period, and later, president of the Senate of South Carolina. He was shot to death by a maniac in the streets of Charleston.

His orations and medical books are now largely forgotten, but his *History of the Revolution in South Carolina, History of the American Revolution, Life of Washington, History of South Carolina* and *History of the United States* contain so many facts based upon personal knowledge and experience that they are of value to present-day students of American history. Considering his period, Ramsay was fairly impartial.

RANDOLPH, *ran'dolf,* JOHN, "OF ROANOKE" (1773-1833), an American statesman of the early national period, a native of Virginia and a descendant of Pocahontas and John Rolfe. After completing his studies at Princeton and Columbia colleges, he began the practice of law, but soon became interested in politics and in 1799 was elected to Congress. As the Democratic-Republican leader of the House, he supported Jefferson in the purchase of Louisiana, but later broke away from the Jefferson faction. Strenuous opposition to war with England cost him his seat in 1813, but he regained it in 1815. He bitterly opposed the Missouri Compromise (which see) and styled its Northern supporters "Doughfaces." In 1825 he was elected to the Senate, where he served for two years, and in 1830 he was sent as special envoy to Russia. Randolph was opposed to slavery, and in his will freed all his slaves and provided for their support. In Congress he gained a reputation for sarcasm and invective, and his strong language in regard to the appointment of Clay as Secretary of State by John Quincy Adams led to a bloodless duel between himself and Clay (see CLAY, HENRY).

JOHN RANDOLPH OF ROANOKE

RANGOON, *rang goon',* capital of Burma, the largest and most easterly province of British India. Its location on the Rangoon River, a branch of the Irrawaddy, makes it a center of the Burmese shipping trade, both foreign and domestic (see BURMA). Rangoon lies twenty-five miles from the Bay of Bengal (see colored map of Asia following page 416), and has a water front along the river a mile in extent. The city is the foremost port of Burma and ranks third among the ports of British India, being surpassed only by Calcutta and Bombay. Teak and rice are the chief exports; cotton, petroleum, wines, silk and woolen goods and household wares are included in the imports. In the city there are lumber, oil and rice mills and manufactories of silk and cottons, pottery and other commodities.

Rangoon is probably the greatest rice market in the world, and its rice mill is as up-to-date as the best in America (see illustration, article RICE). The city has street railways and substantial public buildings, a free library, a college, a museum and a hospital. The visitor there would find especially interesting a famous shrine, sacred to Buddha. This is a pagoda 370 feet high, the mecca of thousands of pilgrims. Two attractive parks and several Oriental bazaars are other features of interest. Population in 1921, 339,527.

RANK IN ARMY AND NAVY. Rank is a word used to designate the different grades or steps in command of naval and army officers. In the army the highest rank is usually held by the head of the nation, though that position may be honorary and not entailing active field

duties. The President is head of the United States Army, holding title under the Constitution, but his power is executed through the Secretary of War. From the general down, each officer holds a title descriptive of the command to which he is eligible. A lieutenant-general commands an army corps; a major-general, a division, and a brigadier-general commands a brigade. These grades of general officers are placed at the head of combinations of all branches of arms and departmental corps. A regiment is commanded by a colonel, assisted by a lieutenant-colonel; a battalion, by a major; a company is commanded by a captain, with the assistance of a first and a second lieutenant. Next in rank come noncommissioned officers called sergeant-majors, sergeants and corporals.

In the United States navy, of which the President is also the head, the highest rank is that of admiral; at present, next comes rear-admiral. The title vice-admiral, when bestowed, implies rank next to an admiral, but the rank usually lapses; there are now no vice-admirals in the list of United States naval officers. After the battle of Santiago, in the Spanish-American War, the friends of Rear-Admiral Sampson and Rear-Admiral Schley entered into a bitter controversy as to who was in command at the time of the battle. This effectively prevented the higher title of vice-admiral from being given to either of these officers, although the friends of each had requested it, and it has not since been conferred on any other officers. The title commodore, coming next to rear-admiral, was abolished in 1905, but it was a very popular rank and carried with it much of the romance of the United States navy, and may be revived. Naval officers of the rank of captain, and below, generally are considered as one step above army officers holding the same title.

The corresponding ranks in army and navy are as follows:

	FIELD OFFICERS:
1	General, $13,500.
2	Lieutenant-General, $11,000.
3	Major-Generals, $8,000.
4	Brigadier-Generals, $6,000.
	REGIMENTAL OFFICERS:
5	Colonels, $3,500.
6	Lieutenant-Colonels, $3,000.
7	Majors, $3,000.
	COMPANY OFFICERS:
8	Captains, $2,400.
9	First Lieutenants, $2,000.
10	Second Lieutenants, $1,700.
	FLEET OFFICERS:
1	Admiral, $13,000.
2	Vice-Admiral, $9,000.
3	Rear-Admirals, $6,000.
4	Commodores, formerly $5,000.
	SHIP OFFICERS:
5	Captains, $4,500.
6	Commanders, $3,500.
7	Lieutenant Commanders, $2,800.
	SUBORDINATE SHIP OFFICERS:
8	Lieutenants, $2,400 to $2,600.
9	Masters, $1,800 to $2,000.
10	Ensigns, $1,200 to $1,400.

The rank of commodore was abolished in 1905, as stated above.

RANKE, *rahng'ke,* LEOPOLD VON (1795-1886), a German historian, born at Wiehe, in Thuringia. He received his education at the best of secondary schools and at the universities of Halle and Berlin. In 1818 he became an instructor of history in a school at Frankfort-on-the-Oder. Like Niebuhr, he set as his ideal the application to history of critical methods, the discarding of prejudice and of tradition. His first book, *A History of the Romance and Teutonic Nations from 1494 to 1514,* with its appended *Criticism of Modern Writers of History,* won for him in 1825 a position in the University of Berlin, and two years later he was sent at government expense to Italy, to study sources. On his way he stopped for some months in Vienna, and there, as later at Venice, Rome, Florence and other cities, he made researches which resulted in most valuable contributions to history.

In 1834 Ranke was made full professor at Berlin, where he remained until 1871. His books, as they appeared at intervals, were accepted by scholars the world over as masterpieces in their field. Besides those mentioned above, his works include *Princes and Peoples of Southern Europe in the Sixteenth and Seventeenth Centuries;* a *History of Germany in the Age of the Reformation; History of France, Chiefly in the Sixteenth and Seventeenth Centuries; History of England in the Sixteenth and Seventeenth Centuries,* and nine volumes of a *Universal History,* which he began in his eighty-first year.

RAN'KIN, JEANNETTE, the first woman ever elected to the law-making body of an independent nation. She was chosen in 1916 to be representative-at-large for the state of Montana in the Congress of the United States. Though Miss Rankin's victory in the elections was acclaimed a triumph for the cause of woman suffrage, it was even more a tribute to her

personal record of unceasing labor in behalf of humanity, to her high ideals and to her practical methods. Running as an independent Republican, and in a state which contains three men for every two women, she defeated a well-known Democratic editor on the same day that the state supported the Democratic candidate for President, elected a Democratic governor and chose a Democrat for her colleague in Congress.

MISS JEANNETTE RANKIN

Born in frontier days on a ranch near Missoula, of a New England mother and a Scotch-Canadian father, Miss Rankin grew up in an atmosphere of liberal, self-reliant thought. She not only acquired skill in the feminine arts, but also learned to do a man's work when necessary. Thus it is said that she makes her own hats and dresses, has cooked for crews of hungry lumbermen and once built a sidewalk. In campaign time most of her traveling is done on horseback.

After her graduation from the University of Montana Miss Rankin was appointed an assistant instructor in economics. Afterwards she studied at the New York School of Philanthropy and at the University of Washington, in Seattle. She has done sociological work in nearly every state in the Union and has visited New Zealand to study social and economic conditions in that land of advanced legislation. She undertook work for woman suffrage because she believed that women must vote before certain fundamental reforms can be secured for the nation; in the course of her labors she has been an active influence in the legislatures of several states and in the Senate of the United States. She directed the campaign which gave suffrage to the women of her own state in 1914. Miss Rankin entered Congress pledged to work for the betterment of humanity, especially by advocating national equal suffrage, national prohibition and child-welfare laws. She was able to put some of these ideas into practice during the special session called by President Wilson after America's entrance into the great war, for it was due to her exposure of conditions in the government Bureau of Engraving and Printing that an executive order went into effect in July, 1917, placing all employes in the Bureau on an eight-hour working-day basis.

RANUNCULUS, *ra nung' ku lus,* a group of annual or perennial herbs belonging to the buttercup, or crowfoot, family. These plants form the representative genus of the family. Of the numerous species the best known are the crowfoot, buttercup and spearwort groups. The plants bear white or yellow flowers, and grow commonly in pastures and gardens or in moist places. Many of them contain poisonous juices which protect them from animals, and as a result they have spread rapidly and become weeds. See ANNUALS; PERENNIALS.

RAPHAEL SANTI, *rahf' a el sahn' te* (1483-1520), one of the most famous men in the history of art, called the "Divine Raphael" and the "Prince of Italian Painting." He was not only a master of painting, but a great architect and a sculptor. His *Sistine Madonna* (see colored reproduction accompanying article under that title) is accounted by many the world's greatest masterpiece.

RAPHAEL

Raphael was born at Urbino, Italy. From his father, a painter of some reputation, he received his first art instruction. When seventeen years of age the ambitious youth was apprenticed to Perugino, a great master of the Umbrian school, but it was not long before the pupil excelled his teacher. Among the best works of this period of Raphael's career, known as the Umbrian period, are *Marriage of the Virgin* (Milan), *Saint George and the Dragon* and *Saint Michael* (Louvre), and several Madonnas. An admirable Madonna of this period (see MADONNA AND HER BABE) is one of the glories of the Metropolitan Museum, in New York.

In 1504, having exhausted the teachings of the school of Perugino, Raphael fulfilled a long-cherished ambition to study at Florence, as wonderful stories had come to him of the famous artists and the great work they were accomplishing. In this city he rapidly gained a wider knowledge of his beloved art. Soon he forsook the style which had individualized his

SISTINE MADONNA

SISTINE MADONNA. Raphael was the greatest of all painters of Madonnas, and this is the greatest of his Madonnas. In fact, many critics do not hesitate to call it the finest picture in the world. The divine purity and tenderness of the mother's face; the sadness and world-knowledge which look out of her eyes without being able to destroy her serenity; the exquisite curve of the baby mouth and the tempered eagerness of the eyes—all these incline the student of the picture to believe that if ever painter was inspired, Raphael was when he painted his *Sistine Madonna*.

The supreme interpreter of beauty, Raphael escaped always that over-sweetness which weakens the appeal of much of Murillo's art. His life flowed along like music, and like music, too, are many of his paintings, exciting emotions impossible of description. The eyes of many of his Madonnas leave the observer with a deep sense of mystery, and it is exactly this which none of his imitators has ever been able to capture. Others might draw as well, might spread their colors as richly, but "the insight and the stretch"—these were Raphael's alone. Browning sums up this quality of Raphael's in the lines:—

> Well I can fancy how he did it all,
> Pouring his soul, with kings and popes to see,
> Reaching, that heaven might so replenish him,
> Above and through his art.

L. J. B.

work under Perugino, for he quickly assimilated the qualities which made famous the other great men of this period. From the works of Masaccio he learned how to group his figures and how to treat draperies; his friend Fra Bartolommeo taught him many secrets of modeling and coloring, and developed his gift for the portrayal of spiritual beauty; from Leonardo da Vinci he acquired grace of expression and a knowledge of composition; while from Michelangelo he learned anatomy and dramatic action. The influence of the sculptors, Donatello and Ghiberti, was also important. Thus he developed what is known as his Florentine manner. Among the finest paintings of this period are the *Entombment* and many well-known Madonnas, including the *Madonna of the Grand Duke* (Pitti Palace, Florence); *La Belle Jardinière* (Louvre); the *Madonna with the Goldfinch* (Uffizi, at Florence); and the *Madonna in the Meadow* (Vienna).

However, he was destined to achieve his greatest triumphs at Rome. In 1508 Pope Julius II called him there to help decorate the Vatican, and it became a veritable museum of his works. Here he painted the world-famous frescoes, which transformed four small chambers into beautiful halls. The frescoes of the first room represent theology, philosophy, law and poetry; those of the second, the triumph of the Church over its enemies; in the third and fourth the decorations are on historical subjects. He also painted numerous religious paintings known as Raphael's Bible upon the ceiling of a loggia, or open gallery, and made designs for some tapestries for the Sistine Chapel. He was now recognized as one of the leading painters of his day. All the powerful nobles of Rome sought his fascinating society, and the commissions for paintings came so fast that he was obliged to leave the execution of some of his frescoes to his pupils, he himself preparing the cartoons, from which the designs were traced (see CARTOON).

Pope Leo X, successor to Pope Julius II, also encouraged art and learning, and under his patronage Raphael executed the famous frescoes, the *Delivery of Saint Peter from Prison* and the *Vision of Attila,* and won further distinction as the chief architect of Saint Peter's. Many of his most beautiful Madonna pictures belong to the later Roman period, including the *Madonna of the Chair* (Pitti Palace, Florence) and the greatest of all the Madonnas in the world, the *Sistine,* which occupies an entire room in the Dresden Gallery. This was painted in 1518, when the brilliant life was drawing to its close. At this time he also executed two other great masterpieces, *Christ Bearing the Cross* (Madrid) and *The Transfiguration* (Vatican). Death prevented Raphael from finishing this latter painting, and at the head of his funeral procession from his studio to the tomb in the Pantheon, this painting was borne, its colors still wet.

Though he died at the age of thirty-seven, Raphael had made his fame secure for all time. Hardly another one of the famous Italian masters equaled him in versatility, for he excelled in whatever form of painting he attempted. His pictures are not only without a flaw in arrangement and spacing, but they have a harmony, grace and spiritual quality that set them apart from all others. His work is the glory of Italian Renaissance painting. R.D.M.

Consult Bolton's *Famous Artists;* La Farge's *Great Masters;* Rose's *Renaissance Masters.*

RAPPAHANNOCK, *rap a han' ok,* a river of Virginia which rises in the Blue Ridge Mountains and flows southeast for 250 miles into Chesapeake Bay. One of the principal cities on its banks is Fredericksburg, at the head of navigation. A fall at this point gives that city excellent water power for the operation of many mills and factories. Below Fredericksburg, for a distance of nearly 100 miles, the river is a navigable tidal stream. The Rappahannock enters the bay through a great estuary, and an important tributary is the Rapidan.

RARITAN, a river of New Jersey, formed by two branches which rise in the northern highlands of the state. It flows southeast for seventy-five miles into Raritan Bay, an inlet of Lower New York Bay. The river is navigable only as far as the fall line, near New Brunswick. Perth Amboy, an important manufacturing center, lies at the mouth of the Raritan. The stream furnishes water power for the mills of the town of Raritan, also on its banks. See FALL LINE.

RASPBERRY, *raz' ber i,* a bramble (thorny bush) which bears delicately-flavored berries. It is a native of the northern hemisphere and with the blackberry, loganberry, strawberry, apple, peach, etc., belongs to the rose family. Some varieties, of which there are more than 100, bear beautiful, fragrant, white blossoms. The fruit is a little cap, a collection of large cells each with a tiny seed at the center, and when ripe separates from the standard about which it grows.

The three best known varieties are the European red raspberry, not cultivated successfully in America, and the native American black and red raspberries. The black variety multiplies in a curious way; the tips of the stalks when bent over and covered with soil send out roots; the new plants so formed are

THE RASPBERRY

cut from the old. The red raspberry is multiplied in two ways: by cutting and planting the suckers, which appear at any time during the growing season, or by dividing the roots of older plants. The roots of both varieties live for a number of years, but the new stalks of one season bear fruit the next, then die.

Black raspberries, though not as large, and somewhat less juicy than the red, are finer flavored. They are more valuable commercially than the red berry and are dried in great quantities for the market. Both varieties are canned and prepared as jam. Raspberry "sunshine" is delicious. It is prepared by mixing a hot white sugar syrup with fresh fruit, and evaporating in the sun until very thick, which requires about four days. The raspberry and loganberry crop of the United States is about 60,000,000 quarts, worth $5,000,000. The Dominion government makes no report of the relatively small crop in Canada.

RAT, one of the larger rodents (gnawing animals), belonging to the same family as the mouse (which see.) Rats differ from mice only in being larger. The two most common species, the *black* and the *brown* rats, are found in nearly all parts of the world. The black rat is between seven and eight inches in length, exclusive of the tail, while the brown grows to be ten or eleven inches long. The latter is the stronger, and has shorter hair, a shorter tail, smaller ears and a less pointed nose than its darker relative. These animals infest boats, wharves, dark and neglected buildings, barns and dwelling houses. They eat food of almost any kind, and frequently kill small poultry. Barriers offer no discouragement to them; with their sharp teeth they can gnaw through wood, plaster or lead. They have a remarkably keen sense of smell and readily detect the approach of danger. It is possible to tame and train them to become interesting pets, as they have considerable intelligence.

THE RAT

Rats breed several times a year, producing from six to fifteen young in a litter. This tendency to rapid multiplication, combined with the fact that rats are carriers of the deadly bubonic plague (see PLAGUE), makes necessary a ruthless war against them. Western United States ports, which are visited by vessels from Oriental countries, where the plague has firmest foothold, are especially active in the campaign of extermination. In this warfare hundreds of thousands of dollars have been spent by the United States government.

RATCHET, *rach'et,* a device for preventing the backward motion of a wheel. It consists of a piece of metal hung on a pivot at one end and having the other end so shaped that it will fit the space between the teeth of the wheel and act as a brace. A *ratchet wheel* is a toothed wheel rotated by a ratchet that is attached to a lever having a forward and backward or an up and down motion. The wheel that moves the carriage of a typewriter forward is a good example. With the pressing down of each key the carriage is moved forward the space of one letter. The pawl, which is the same as the ratchet, prevents the spring that produces the tension from pulling the carriage back.

RATEL, *ra'tel,* a small animal of India and Africa, belonging to the badger family. It is dark gray on the upper part and black below; this is a strange coloring in mammals, whose darker fur is usually on the upper part. The African ratel has a distinct white line around the body between the black and gray fur, and its teeth are smaller and weaker than those of the Indian animal; otherwise the

THE RATEL

RATTAN.

How the rattan plant grows; the real cane is below the skin. Removing the skin and washing the cane for shipment.

two are almost identical. The ratel eats insects, frogs, birds and rats. It is very fond of honey, and is sometimes called *honey badger.*

RATIO, *ra'shi o,* the relation which one quantity has to another quantity of the same kind. The only way in which two quantities can be compared is by division. Now a fraction is always an expression of division. Ratio is therefore expressed by a common fraction, as ⅔ and 11/8. The fraction ⅔ expresses the ratio of 2 to 3. The fraction 11/8 expresses the ratio of 11 to 8. These ratios, instead of being written as fractions, are also expressed as 2:3 and 11:8. Ratio cannot exist between two quantities of different kinds. For instance, to find the ratio between 4 quarts and 6 pints, the quarts must first be reduced to pints or the pints to quarts, 4 quarts=8 pints. The ratio of 8 pints to 6 pints=8/6=4/3, or 4:3. Again, 6 pints=3 quarts. The ratio of 4 quarts to 3 quarts=4/3 or 4:3. See Proportion.

RATIONALISM, *rash'un al i'zm,* a term which has come from a Latin word meaning *reason,* in the broadest sense means *reason,* as opposed to *faith.* As the Christian religion spread and the power of the Church increased, a good deal of arbitrary authority came to be exercised in matters of faith. As learning increased, men revolted more and more against any authority in matters of belief. They questioned not only the authority of the Church but also that of the Bible, and certain scholars claimed that one could believe nothing unless it could be proved. Many philosophers taught that such instinctive feelings as love, trust, confidence, courage and fear could have no influence on *belief;* that only the reasoning *mind* could say what was to be believed. Voltaire, Lord Bacon, Descartes and Kant are a few of the men who taught rationalism in various forms.

RAT'ISBON, or **REGENSBURG,** *ra'gens boorK,* an ancient city of Bavaria, capital of the Upper Palatinate. It is pleasantly situated on the right bank of the Danube, opposite the mouth of the Regen, sixty-five miles northeast of Munich. It is a city that seems to have neglected to keep pace with modern progress, for its narrow, crooked streets and curious old houses with their turreted roofs are as they were in medieval days. There are many buildings of historic interest, including the fifteenth century Rathaus, where the sessions of the imperial diet were held from 1663 to 1806. The chief manufactures include iron and steel wares, pottery, parquet flooring and lead pencils, while a brisk transit trade is carried on in salt, grain and timber. Originally a Celtic town bearing the name of Radasbona, Ratisbon was later made a frontier fortress by the Romans. Subsequently it became the capital of the dukes of Bavaria. In 1245 it was declared a free imperial city by Frederick II, and for a long time was the seat of many important diets. In 1810 Ratisbon was ceded to Bavaria. Population in 1919, 52,510.

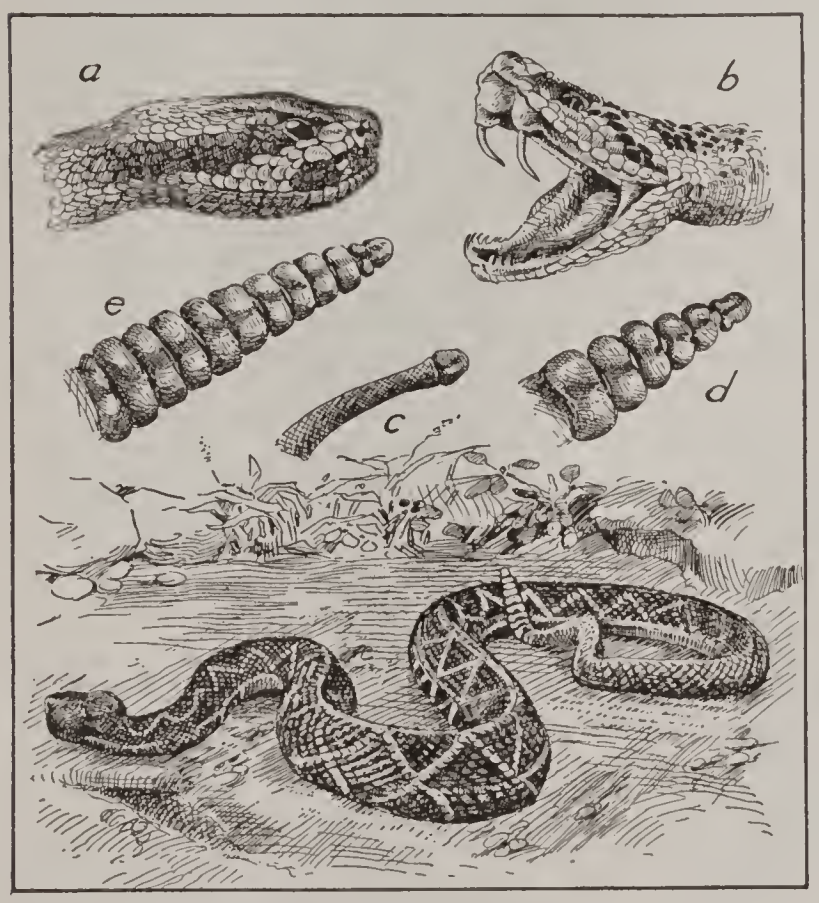
RATON, *ra tohn',* N. Mex., the county seat of Colfax County, situated in the northeastern part of the state, eight miles from the Colorado state line and 111 miles northeast of Las Vegas. It is on the Atchison, Topeka & Santa Fe, and the Santa Fe, Raton & Eastern railroads, and is a division point of the Santa Fe System, which maintains railroad shops employing 350 men. The population in 1920 was 5,544. Raton has a fine courthouse and city hall, public library, state hospital for miners, county high school and public parks. Extensive coal fields are adjacent to the city, and the principal business interests are coal mining and stock raising. Three thousand men are employed by one company. The city has also ice and brick plants, a creamery, and a greenhouse with a large shipping trade. Raton was settled in 1880 and incorporated as a city in 1891.

RATTAN', a group of tropical palms, the long, slender stems of which form the rattan of commerce. In the countries where the rattan palms grow the natives use the stems to make ropes and mats, and they are extensively imported by American and European countries for use in the manufacture of umbrella handles, walking sticks, furniture, baskets and chair bottoms (see Cane). The natives prepare the stems for shipment by cutting them into lengths of five to twenty feet and tying the pieces into bundles. They free the stems from the leaves and outer covering by pulling them through a notch in a tree or board. Strength, flexibility and durability are the special qualities which make rattan a valuable commercial product. The finest grades come from the island of Borneo, and other valuable rattans are produced in Burma, Ceylon, Malaysia and Sumatra. Some species of rattan palms yield an edible fruit, and the young shoots are eaten like vegetables.

See the subhead *Habits of Growth,* under the heading Palm.

RATTLESNAKE, *rat''l snayk,* the name of a group of American reptiles whose distinguishing characteristic is the possession of a horny

rattle at the end of the tail. This organ vibrates noisily when the snake is roused to anger or fear, and so serves as an excellent warning to an enemy. As the reptile has a very poisonous bite, the warning rattle is a protection to people. These snakes are somewhat sluggish and seem to prefer to be let alone, but when they strike they act with surprising quickness. The rattle is a series of hollow rings, or joints, which are loosely joined together, each one fitting over a part of the preceding one. The first, formed at the end of the tail, is the smallest, for it originally grew over the soft body of the young snake. Each time the skin

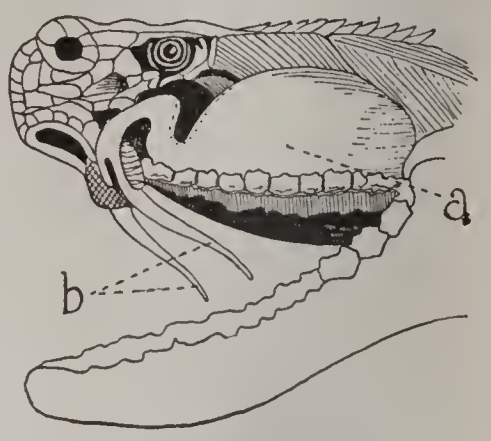


THE RATTLESNAKE

(*a*) Head; (*b*) head, showing open mouth; (*c*) tail of a snake one year old; (*d*) tail of a snake two years old; (*e*) the rattle of an adult in its fourth year. The lower illustration is that of a diamond-back rattlesnake.

is shed, which happens two or three times a year, a new ring is formed, and the joints gradually increase in size as long as the snake grows. Those developed after the reptile is full grown are all of one size. The number of rings does not, therefore, as is generally believed, represent the number of years a snake has lived. In the British Museum there is a rattle with twenty-one joints—the largest one in the collection.

Rattlesnakes are thick, heavy snakes, but they are not as a rule over five feet in length. The most common species is found in the United States as far west as Kansas. The body varies in color from tawny to dark brown, and has numerous crossbars of irregular brown spots. A much larger species, the diamond rattlesnake, occurs in the Southern states. Specimens eight feet long have been found on the Mangrove Islands of Western Florida. This rattlesnake is so called because its body is covered with black, diamond-shaped blotches edged with yellow. There are various other species in Western United States, Mexico, Central America and South America.



DISSECTED HEAD

(*a*) Poison sac; (*b*) erectile fangs, which fold against the upper jaw.

Rattlesnakes eat rats, mice and other small gnawing animals, and are themselves eaten by pigs, whose tough skin and layers of fat prevent the reptile's bite from being dangerous to them. See SNAKE.

Consult Ditmar's *The Reptile Book;* Cope's *Crocodilians, Lizards and Snakes of North America.*

RAUCH, *rauK,* CHRISTIAN DANIEL (1777-1857), a German sculptor of high rank. His great monumental works, especially his masterpiece, the magnificent bronze statue of Frederick the Great, in Berlin, are thoroughly national in spirit and are characterized by dignity, harmony and beauty of conception and composition.

Rauch was born at Arolsen, in Waldeck principality. In his boyhood he served as a sculptor's apprentice. In 1797 he became valet to Frederick William III of Prussia, but his love for art soon asserted itself, and through the generosity of a nobleman he was enabled to study at Rome, where he enjoyed the friendship of Thorwaldsen and Canova. His first productions of note were *Sleeping Endymion and Artemis* and a bust of Queen Louise. A monument to this queen in the royal mausoleum at Charlottenburg, begun by the sculptor in 1818, established his fame. The following year he founded in Berlin a royal atelier of sculpture. His bronze statues of Field-marshal Blücher and Maximilian of Bavaria, and his busts of Dürer, Goethe and Thorwaldsen are a few of the many fine examples of his genius.

RAVEN, *ra'v'n,* the largest of the members of the crow family, a bird of much intelligence and cunning, known from the remotest times and connected with the history and mythology of many nations. It is the first bird named in the Bible. Noah sent a raven out from the Ark

(*Genesis* VIII, 7), which flew to and fro till the waters were dried up. Elijah, by the brook Cherith, was fed by ravens (*I Kings* XVII, 6), and in both the Old and New Testaments the bird is mentioned in illustration of God's care for his creatures. Pliny, the Latin naturalist and writer, tells the story of a raven that raised the water in a bucket to a drinking level by dropping in pebbles.

The Scandinavian peoples held the raven in veneration, and when the Danes came against England in the ninth century their flag bore a black raven on a red field. The Indians of Northwestern North America regard the bird

THE RAVEN

as the visible representation of some mystical, unseen being, and its image is the totem of some tribes (see TOTEM). Its black color has long made the raven an omen of disaster and death to superstitious minds. Poe, in his poem *The Raven,* makes it the symbol of his weird and melancholy mood, as illustrated by the lines:

Take thy beak from out my heart and take thy
form from off my door.
Quoth the Raven, Nevermore.

Ravens are found in Asia, Africa and America. They have been known to measure twenty-six inches in length and to have a wing breadth of three feet. They live as long as a man, and are said to mate for life. Their nests are built in the late winter on cliffs or in ancient dwellings. The eggs are from four to seven in number and are of a light greenish color, blotched with brownish spots. The mistaken idea that the raven is destructive to crops has caused its extinction in some localities, but it is now considered to be beneficial in destroying the small rodents that are the farmer's real enemies.

Consult Newton's *Dictionary of Birds.*

RAY, a group of fish including six different families. The general characteristic of the group is their possession of expanded and fleshy pectoral fins, which are seemingly continuations of the body. In some cases these form with the body a flat disk. The six families are represented by the sawfish, the shark rays, the electric rays, the skates, the sting rays, and the eagle rays, or devil fish.

Related Subjects. The reader is referred to the following articles in these volumes:

Devil Fish	Sawfish
Electrical Fish	Sting Ray
Skate	

RAYMOND, *ra'mund,* a town in the extreme southern part of Alberta, twenty-six miles south of Lethbridge, forty miles northeast of Cardston, and about thirty-five miles directly north of the United States boundary. It is on a branch of the Canadian Pacific Railway. The town and its vicinity are inhabited largely by Mormons from the United States, who have developed this section by dry farming. It is the seat of a government school of agriculture. Wheat and live stock are also raised in considerable quantities. The town has several grain elevators and other business establishments. Population in 1911, 1,465; in 1921, 1,394.

RAZOR, *ra'z'r,* an instrument used to remove beard from the face. The modern razor has a blade from three to four inches in length, made of the finest steel, with a rounded back, sloping to a very fine edge. The blade is generally bound by a rivet to two pieces of metal, ivory or bone, between which the blade rests when not in use, closing like a springless knife. Sheffield, England, once produced the world's best razors, but many German factories have in recent years equaled the best Sheffield product. America has not yet produced blades equal to the European product. The high quality razors made in England usually cost from six to twenty shillings ($1.50 to $5) or more, if mounted in elaborate handles. German-made razors are sold for considerably less, the average being about $1 to $4, the difference in price being due to differences in labor conditions rather than in quality.

There is an increasing demand for what are known as "safety razors." These have short, rectangular blades mounted at such an angle in holders that it is almost impossible to cut one's face during the operation of shaving. Safety razors have ready sale in the United States and in Canada and cost from $1 to $5, though more expensive kinds may be bought.

Razors were used by the men in Egypt, the cradle of civilization; they preferred clean-shaven to bearded faces. Julius Caesar wore neither beard nor mustache. In the English army regulations there still stands a curious order to the effect that no soldier shall shave his upper lip; if a man in the English navy wishes to use a razor he must shave both beard and mustache. These olden-time orders, however, are not strictly obeyed. The United States army and navy regulations permit the use of the razor as one prefers.

RE, *ray,* the god of the sun in ancient Egyptian mythology. After Re had brought order out of the original chaos, which was the world, he reigned in peace until in his old age the gods became unruly and Isis led a rebellion against him. In this rebellion even mankind joined, and all must have perished had not Re himself called back the goddess Hathor, whom he had sent to destroy them. But the weight of his years told on his spirit, and finally he willingly resigned his rule and retired to the heavens, where he rests on the back of the celestial cow. In Egyptian art, Re is a hawk-headed man holding the royal scepter in one hand, the symbol of life in the other. His head is crowned with a disk and serpent.

REACTIONS, *re ak'shunz.* In chemistry certain substances may be brought into contact with each other without any chemical change; each substance remains exactly what it was before. There are others, however, known as *agents,* which affect each other strongly. The chemical change which results is known as a *reaction.* Often reactions seem to the beginning student very curious; two substances may be transformed into another, or into more than one other, which possesses not the least resemblance to either of the original agents, and yet nothing has been added or subtracted. Thus if hydrochloric acid is poured on caustic potash, water and chloride of potassium are formed. To the chemist, however, the process is perfectly simple. Hydrochloric acid is HCl and caustic potash is KOH (see CHEMISTRY, subhead *Chemical Symbols*), and the combination may be expressed as KOH+HCl; while water is H_2O and chloride of potassium is KCl, and the combination may be written H_2O+KCl. The reaction may thus be expressed as KOH+HCl=H_2O+KCl. It is evident, now, that on each side of the equation there are two atoms of hydrogen (H), one atom of oxygen (O), one atom of potassium (K) and one atom of chlorine (Cl).

This subject of reactions plays a very large part in the study of chemistry. The doctrine of chemical affinities, the atomic theory, the question of chemical compounds are all bound up with it. The reader is referred, therefore, to the general article CHEMISTRY in Volume II, and to the references listed at the end of that article.

READ, *reed,* OPIE PERCIVAL (1852-), an American novelist and humorist, born at Nashville, Tenn. After a very brief school course, he became a newspaper reporter at Franklin, Ky., served on various Arkansas and Ohio papers until 1883, and in that year established a humorous journal which became famous—*The Arkansas Traveler.* After 1891 he engaged in literary work in Chicago, making that city his home. Such fiction as *A Kentucky Colonel, A Tennessee Judge, Old Ebenezer* and *A Yankee from the West* has gained a wide reading, because of the charm of local color, the unique characters portrayed and the appeal to the emotions. He has achieved a degree of success on the lecture platform.

READ, THOMAS BUCHANAN (1822-1872), an American poet and painter, best known for his stirring ballad of the War of Secession—*Sheridan's Ride.* He was born in Chester County, Pennsylvania, and his early youth was spent on his father's farm. The Boston *Courier* published his first verses in 1843. In 1850 Read went to Rome to study painting, for he was chiefly interested in art. *The Lost Pleiad, The Water Sprite* and *Sheridan and His Horse* are among his best-known paintings. His writings include *Lays and Ballads, The New Pastoral* and *The House by the Sea. Female Poets of America,* compiled by him in 1848, contained illustrations reproduced from portraits he himself had painted.

The following stanza from *Sheridan's Ride* illustrates its rhythm and martial spirit:

Up from the South at break of day,
Bringing to Winchester fresh dismay,
The affrighted air with a shudder bore,
Like a herald in haste to the chieftain's door,
The terrible grumble, and rumble, and roar,
Telling the battle was on once more—
And Sheridan twenty miles away.
And wider still those billows of war
Thundered along the horizon's bar;
And louder yet into Winchester rolled
The roar of the red sea uncontrolled,
Making the blood of the listener cold,
As he thought of the stake in that fiery fray—
And Sheridan twenty miles away.

READE, *reed,* CHARLES (1814-1884), an English dramatist and author of many novels.

After graduating from Magdalen College, Oxford, in 1835, he became dean of arts, and later vice-president of his own college. In 1843 he was called to the bar, and from that time he lived in London. His first play appeared in 1851, and his first novel, an expansion of a play written in collaboration with Tom Taylor, in 1853. He had a most vivid imagination, and while never a great writer his plots were always so cleverly constructed that his books have enjoyed great popularity. He wrote, generally, with a purpose in view, attacking current social abuses, as in *Never Too Late to Mend,* which exposed the English prison system; *Hard Cash,* attacking the cruelties then practiced in many insane asylums; and *A Woman-Hater,* advocating women's rights.

His best-known and most interesting novel is *The Cloister and the Hearth,* the story of the youth of the parents of Erasmus.

READ'ING. "Reading," says Addison, "is to the mind what exercise is to the body. As by the one health is preserved, strengthened and invigorated, by the other virtue (which is the health of the mind) is kept alive, cherished and confirmed." Henry Ward Beecher likened books to "windows of the soul, through which the mind looks out. Without books not only would schools, colleges and universities disappear, but everything which we call culture would vanish, and society would lapse at once into barbarism." What is true of society is true of the individual, and he who does not read, and read systematically, soon finds himself to be out of touch with the world and lacking in sympathy with the social, political and scientific movements of his time. Everyone should read for the following reasons:

1. To keep himself informed upon affairs of the times.
2. To understand the reason for many of the great movements for the benefit of society.
3. To keep himself informed upon the progress in the fields of science and invention.
4. To store his mind with the thoughts of the great intellects of all ages.
5. To enable him to keep up with the progress of his vocation.
6. For recreation.

Every one knows that he should read, and practically every one does read to a greater or less extent, but the question is—does each get the greatest value possible from his reading? It is the purpose of this article to offer a few suggestions that may be helpful to the reader. The subject naturally divides itself into the following subdivisions: *what to read; how to read; when to read; reading aloud.* These are treated in the following paragraphs.

What to Read. The selection of reading matter must be left very largely to the needs and taste of the reader. There is, however, a certain line of reading that is necessary to the person who wishes to lay a good foundation for his growth in knowledge. First of all, he should subscribe for a good daily paper, or for the weekly edition of some great metropolitan daily. He should also subscribe for a weekly or monthly publication which gives a reliable review of the world's events. To these he should add a good magazine. These periodicals may constitute the beginning of one's library. Items in the daily paper may be clipped, and the other journals may be preserved and bound.

One living near a good public library will need to purchase only a few books. Some books, however, are indispensable, even when the library is close at hand. These are a good dictionary and a work of general reference. While an unabridged dictionary is desirable, it is not indispensable, since the college edition of the great dictionaries usually satisfies all the demands of the average reader. Neither is a large and expensive work of general reference necessary. A medium-sized work which states facts in a clear and concise manner, without giving long, scientific discussions that are of interest only to specialists, will meet all requirements.

With the dictionary and reference work for a foundation, one can build his library to suit his purse and inclination. Let the advantages of the public library be what they may, every one should occasionally buy a book for the mere pleasure of owning it, and of feeling that he can annotate it as he reads, thus blending his thought with that of the author.

The most valuable private libraries are those that grow slowly. If a book is not bought until it is needed, it will be read and probably reread, and "one book read is worth a dozen looked at." A book not worth reading more than once is not worth buying. Many of the works of modern fiction are like the moth that flies in the light for an evening and then disappears forever. These works have their brief period of popularity, then they pass into oblivion; it is not wise to fill one's bookshelves with them. Some new books, especially the works of standard authorities on scientific subjects, should be sought, but others should be allowed to prove their worth. Bulwer Lytton's advice is good:

> In science read by preference the newest works; in literature, the oldest. The classic literature is always modern.

In collecting a library one should have due regard for variety. Some of the standard works of fiction, such as those of Dickens, Scott, Thackeray, Hawthorne, Howells and other great writers; the works of Shakespeare, Tennyson and the leading American poets—Longfellow, Whittier, Lowell, Holmes and Emerson; a few biographies; at least one or two good works on American and English history and an occasional volume on some scientific subject in which the reader is interested will give one a library which, though small, will satisfy many demands.

How to Read. Professor Henry Van Dyke says there are three classes of readers—the simple reader, the intelligent reader and the gentle reader. Readers of the first class read chiefly to occupy their spare time and without any particular purpose. The intelligent reader, on the contrary, reads for information and remembers what he reads. Readers of this class usually follow lines of investigation in which they are interested and value books according to the accuracy of their information. The gentle reader reads to broaden his intellectual and spiritual life, "to purify his tastes, deepen his feelings and broaden his sympathies." He loves literature and seeks it because it leads him to a finer and fuller manhood. The reader of this article must decide for himself to which of these classes he belongs, but whatever the class, he will derive benefit from his reading. With this general statement we offer the following suggestions:

1. During the school period of his life the child should acquire a love for good books, and on leaving school he should continue his reading, because it will help him to connect his studies with the affairs of everyday life.

2. "There is as much need of system in using literature as in studying chemistry." Follow a system in reading, not only in pursuing some line of investigation, but in *all* reading. The reading habit, like all other habits, is formed slowly. It is better to plan wisely and make a right beginning than to have to "back-track" when one discovers that he is on the wrong road.

3. Form the habit of reading thoughtfully. It is not how much you read but how much you gain from what you read that counts. When a page has been read stop and try to reproduce the thought it contains. If unable to do it, read the page again. By continuing this practice one will in a short time, be able to glean the thought of an author with ease and accuracy.

4. Acquire the art of skipping. It is as senseless to read a metropolitan daily through as it is to attempt to eat through the menu at a restaurant. The wise reader will skip the society scandals, sensational reports of crime, and those advertisements and other matters which hold no special interest. Some books contain chapters or parts of chapters which are of little or no value. The discriminating reader soon learns to discover these passages and to pass over them lightly or omit them altogether. The art of skipping saves valuable time and enables the reader to pass over matter that is uninteresting and often objectionable.

5. Use a notebook. Every book of value contains discussions, facts or descriptions worth placing where they can be easily found. If the book is personally owned these passages can be marked, and an index of them may be placed on the flyleaf, or recorded in a notebook. But if the book is from the library or is one that has been loaned by a friend, the passage should be copied. Besides the opportunity it affords for collecting information, note taking is an excellent aid to memory.

6. When reading for recreation drop every consideration except pleasure of reading, and let the book or the magazine drive away the cares and worry of the day.

7. Make use of what is read. "Books," said Washington, "are waste paper unless we spend in action the wisdom we get from them."

Time for Reading. One will secure better results for a given expenditure of effort if a regular time is set apart for reading each day, but many are so situated that such an arrangement is impracticable. They must read when they can. The business man may glean the news from his daily paper on his way to and from his office. Many a student working his way

through college does much of his studying at short intervals between his hours of labor. One young man became a proficient accountant by studying bookkeeping while he was running an elevator. Thousands of instances might be cited to prove that "it is not the long space of time, but the single purpose that turns every moment to account that makes great and fruitful acquisitions possible to men and women and boys and girls who have other work in life." He who has a love for reading can and will find time for it.

Reading Aloud. Ability to express the thoughts of another so as to hold the attention and awaken the sympathy of the listener is an accomplishment of which anyone may well be proud. Every child should learn to read aloud, and he should be given such training and practice as will enable him to convey to others the thought on the printed page in a pleasing and effective manner. It seems a misfortune that the public schools no longer place the emphasis upon the importance of reading aloud that formerly characterized the instruction in reading.

Anyone who desires to become proficient in reading aloud can do so through self-training, by following a few simple suggestions and giving himself sufficient practice.

1. First of all, learn the distinction between reading and calling words. Many a child in school has a vague idea that when he has given vocal utterance to the words on the page his work as a reader is done, and not a few adults hold the same idea. Reading aloud is giving such expression to the thought of the author as to make it live in the minds of those who listen.

2. The reader must try to put himself in the author's place. Picture the scenes he describes. See his characters as real people. Then the reading will convey these ideas to hearers.

3. If uncertain about articulation and pronunciation of words, listen to good public speakers and notice their articulation, then practice on those sounds which are habitually uttered indistinctly. In silent reading form the habit of never passing over a word without learning its pronunciation.

4. Practice. We learn to do by doing. Read aloud for at least a half hour every day until reading is natural and without noticeable effort.

5. Do not attempt to become an elocutionist unless there is evidence of a special aptitude for such work.

Reading aloud confers a benefit upon the reader as well as upon those who listen. We get a clearer conception of the thought of the author and remember what we read longer if we read aloud. This accomplishment often enables one to be a blessing to those who, because of illness or other disabilities, are unable to read for themselves, and ability to read a good story well is one of the most potent means of entertaining the children at home and keeping them from questionable amusements. See, also, STORY-TELLING. W.F.R.

Suggestions on Teaching Reading

The reading lesson should be the most interesting period of the day, and the teacher who has acquainted herself thoroughly with her work and with her pupils will have no difficulty in making it so. Some pupils have a pronounced distaste for arithmetic, others seem to have no aptitude for science; but any child may be made to feel a keen interest in his reading lesson if the correct methods are pursued. The following paragraphs do not aim to present in full the method of teaching reading; they contain, rather, supplementary suggestions which may be made use of in connection with any method.

Silent Reading. There are two processes involved in reading, as that subject is taught in the schools—thought getting and thought giving. The former is in the end the more important, for silent reading, or thought getting, makes up practically all the reading that is done in later life. In the schoolroom, however, thought giving, or oral reading, must be emphasized, for only by means of this process can the teacher assure herself that her pupils are acquiring correct habits of pronunciation and that they are mastering the still more difficult art of grasping the meaning of a sentence or paragraph. It seems a simple enough matter to read a paragraph of clear, well-written English and to get its sense; but high school teachers can bear witness that many of the pupils who come from the grammar school cannot do it, and teachers in college frequently find to their surprise that a high school course has failed to impart the necessary ability.

For the most part, the silent reading precedes the oral, though occasional exercises in sight reading are very helpful. At the close of one class session the teacher assigns the lesson for the next day, but this assignment should not consist of a mere "Take pages 126 to 133 for to-morrow." The teacher should have her work carefully planned at least one day in advance, and should give the pupils such suggestions as

will make the new lesson most helpful and interesting. If the selection chosen, for instance, is a cutting from a book, a brief sketch of the book and of the part which the selection plays in it will add interest. Or if the children have had thoughts and experiences which will aid them in understanding what they are going to read, these should be brought out by means of an informal conversation. At times it may be wise to write on the board and explain the words in the newly assigned lesson which are certain to give trouble.

After this preparation the pupil is ready for the reading of the selection. The first reading should be silent, and of course the teacher has no means, except the later oral reading, of knowing how carefully this phase of the work has been done. Occasionally she may require the pupils in her older classes to write out without their books the sense of a paragraph or of a brief selection. This should not be resorted to very frequently, however, nor should this method be used with prose selections which are conspicuously beautiful in style, nor with poetry.

When the pupil has learned to read intelligently, he should be encouraged to read hastily —that is, to take in the sense of a line at a glance. If each word receives in turn the undivided attention of the reader, comprehension of a sentence or of a thought unit as a whole is impossible.

Oral Reading. Though this is, as stated above, for the most part a means to an end, it is of the utmost importance, and should receive the most careful attention. Since the main object of reading is to secure information, getting the thought is of even more importance than correct pronunciation. Fortunately, the teacher can almost always tell by the inflections whether or not the pupil is "getting the sense," and obvious failure to do so should never go unnoticed. Sometimes, however, a pupil becomes discouraged if he is constantly stopped in his reading and corrected, and the teacher may find it wise to wait until the paragraph or other thought unit has been finished before offering criticism. Several ways of suggesting improvement are possible. The teacher may read the paragraph just as the pupil has read it, and allow him to discover the faults of his method himself; or she may allow the other pupils to criticise. This is frequently an excellent process, but the teacher should see to it that these criticisms are offered in the right spirit. A variation of this idea is to allow one pupil to read until a mistake is noticed by one of the others, then to let the latter continue the reading until he, too, is "tripped up" by a third pupil.

If one pupil reads too slowly and another too rapidly, the two may be given a paragraph to read in unison, with the provision that they must keep together. Occasionally, if a pupil's reading is persistently monotonous, he should read in concert with the teacher, copying her inflections. On the whole, however, concert reading in any form has little to commend it; it is better for the pupil to read once a week by himself and receive careful criticism than for him to read in concert with the whole class every day.

Persistent drill is needed to overcome such faults as reading too rapidly or too slowly or with too little expression, as well as to overcome embarrassment, but the teacher should beware of drilling one pupil too long on the same thing. If he becomes discouraged or tired, harm rather than good will result. After all, the teacher will remember that it is reading and not elocution which is being taught; she will realize that her chief duty is not to criticize or to judge the pupil's work, but to help him to appreciate the beauties of what he reads and to be able to interpret them so that others may enjoy them also.

Selections for Study

Two poems, which never fail to appeal to children everywhere, are here given, with suggestions as to the method of dealing with them in a reading lesson. Certain definite rules should be kept in mind:

1. The value of a study may be decidedly lessened, if not destroyed, if the selection does not suit the age and capacity of the class. A fairy story in which third-grade pupils will delight will rouse only scorn in the boys of the sixth or seventh grade.

2. A selection should never be laid aside until the teacher is certain that every word is understood by the pupils.

3. Drill on any selection, especially a poem, should not be continued until the class becomes weary and the selection loses its beauties. Many a man dislikes poems which might otherwise mean much to him, just because they were "dry studies" to him in his childhood.

4. Bits of information as to the life of the writer, the subject he is discussing or the circumstances under which the selection was written arouse the children's interest effectually.

The Village Blacksmith. This is one of the poems which is popular alike with children and older people. It is so clear that a child can understand it after a brief study, but it voices truths and sentiments which make it of permanent value.

Introductory. If this is the first poem of Longfellow's which has been assigned, a sketch of the poet's life may well precede the study. The biography on page 3494 will furnish ample material. The teacher may present this, or, still better, an entire reading or language period may be given over to it, and the children themselves may prepare it. Assign to one pupil the story of his ancestry and his childhood, to another the account of his boyhood and young manhood, and so on. Lay special emphasis on the qualities which won him the name of "The Children's Poet."

Teacher's Preparation. 1. Read the poem carefully.

THE VILLAGE BLACKSMITH

Under a spreading chestnut tree
The village smithy stands;
The smith, a mighty man is he,
With large and sinewy hands;
And the muscles of his brawny arms
Are strong as iron bands.

His hair is crisp, and black, and long,
His face is like the tan;
His brow is wet with honest sweat,
He earns what'er he can;
And looks the whole world in the face,
For he owes not any man.

Week in, week out, from morn till night,
You can hear his bellows blow;
You can hear him swing his heavy sledge,
With measured beat and slow,
Like a sexton ringing the village bell,
When the evening sun is low.

And children coming home from school
Look in at the open door;
They love to see the flaming forge,
And hear the bellows roar,
And catch the burning sparks that fly
Like chaff from a threshing-floor.

He goes on Sunday to the church,
And sits among his boys;
He hears the parson pray and preach,
He hears his daughter's voice,
Singing in the village choir,
And it makes his heart rejoice.

It sounds to him like her mother's voice,
Singing in Paradise!
He needs must think of her once more,
How in the grave she lies;
And with his hard, rough hand he wipes
A tear out of his eyes.

Toiling, rejoicing, sorrowing,
Onward through life he goes;
Each morning sees some task begun,
Each evening sees its close;
Something attempted, something done,
Has earned a night's repose.

Thanks, thanks to thee, my worthy friend,
For the lesson thou hast taught!
Thus at the flaming forge of life
Our fortunes must be wrought;
Thus on its sounding anvil shaped
Each burning deed and thought.

2. Be sure that the pictures in the poem are clear enough in your own mind so that you can make the children see them.

3. Go through the poem word by word, to assure yourself that you can explain every term used and can give concrete illustrations.

4. Divide the poem according to its units of thought. This division does not always coincide with the stanza division.

(*a*) Stanzas 1 to 3 present the smith and the smithy.

(*b*) Stanza 4 shows the children at the smithy.

(*c*) Stanzas 5 and 6 show the smith at church.

(*d*) Stanzas 7 and 8 set forth the lessons which the poet has learned from his study of the smith's life and character.

5. Be able to tell, in interesting manner, the history of the poem, and to give some of the little details which make it seem alive:

(*a*) This smithy stood for years on Brattle Street, in Cambridge, under its great overarching chestnut tree. Many and many a time, on his walks, Longfellow heard the clang of the smith's hammer while he was still far off, and as he came near saw the flying sparks. He, too, like the children, must have stopped many a time to "look in at the open door" and doubtless the children laughed and talked with him, for they were never afraid of him.

Many people had seen the smith at his work, but only Longfellow possessed the genius to make the smith and the smithy famous, and when, some years after this poem was written, the great chestnut tree was cut down to make room for a dwelling house, the people of Cambridge eagerly sought the chips as souvenirs. Out of the wood of this tree was made an armchair, which the children presented to the poet on his seventy-second birthday.

The Recitation. 1. Have the poem read aloud, each stanza by a different pupil.

2. By questioning, lead the pupils to separate it into its thought units.

3. Have it read again according to this division, letting one pupil read the first three stanzas, another the fourth stanza, a third the fifth

and sixth stanzas, and a fourth the seventh and eighth.

4. Watch carefully for the faulty expression which shows lack of comprehension.

5. Let each pupil indicate the words whose meaning is not perfectly clear to him, and explain these.

6. Pick out the objects in the poem which may be strange to some of the children. Many city dwellers have probably never seen a smithy. Others know nothing of the manner of growth of a chestnut tree, or will not get the exact significance of the sledge, the bellows, the chaff or the threshing floor. Only as definite pictures of all of these are called up in the child's mind can the pictures in the poem be complete.

7. Emphasize, though not too strongly, the lessons taught in the last two stanzas. The lesson of industry taught in stanza seven is quite within the comprehension of any pupil who can read the rest of the poem understandingly, but the lesson of the last stanza cannot always be fully grasped by young pupils.

Review. 1. If the class is not large, have each pupil read the entire poem.

2. Have the pupils memorize the poem.

Incident of the French Camp. This differs from *The Village Blacksmith* as decidedly as Browning differs from Longfellow, for each is typical of its author.

Introductory. A story of the life of Browning, based on the biography on page 956, may well precede the reading of this poem. While Browning is far from being a children's poet, he has qualities which can be an inspiration to any child, and he wrote a number of poems, such as this *Incident of the French Camp, How They Brought the Good News from Ghent to Aix* and *Hervé Riel,* which every child should read. Lay emphasis on his optimism and his courage.

Teacher's Preparation. 1. Read the poem carefully, marking points which call for study or explanation.

INCIDENT OF THE FRENCH CAMP

You know we French stormed Ratisbon:
  A mile or so away,
On a little mound, Napoleon
  Stood on our storming day.
With neck out-thrust, you fancy how,
  Legs wide, arms locked behind,
As if to balance the prone brow
  Oppressive with its mind.

Just as perhaps he mused, "My plans
  That soar, to earth may fall,
Let once my army-leader Lannes
  Waver at yonder wall,—"
Out 'twixt the battery-smokes there flew
  A rider, bound on bound
Full-galloping: nor bridle drew
  Until he reached the mound.

Then off there flung in smiling joy,
  And held himself erect
By just his horse's mane, a boy:
  You hardly could suspect—
(So tight he kept his lips compressed,
  Scarce any blood came through)
You looked twice ere you saw his breast
  Was all but shot in two.

"Well," cried he, "Emperor, by God's grace
  We've got you Ratisbon!
The Marshal's in the market place,
  And you'll be there anon,
To see your flag-bird flap its vans
  Where I, to heart's desire,
Perched him!" The chief's eye flashed; his plans
  Soared up again like fire.

The chief's eye flashed; but presently
  Softened itself, as sheathes
A film the mother eagle's eye
  When her bruised eaglet breathes.
"You're wounded!" "Nay," the soldier's pride
  Touched to the quick, he said:
"I'm killed, Sire!" And his chief beside,
  Smiling, the boy fell dead.

2. Mark all passages which show peculiarities of structure, omission of words or inversion of the natural order of words, as *nor bridle drew, his chief beside, to heart's desire, full-galloping.* These are very characteristic of Browning.

3. Acquaint yourself with the following facts, which will be necessary in making the poem clear to the pupils:

(*a*) *Ratisbon,* or Regensburg, is a city in Bavaria. Napoleon's forces did storm it in 1809, as the poem relates, and reduced a great part of the city to ashes. See the article RATISBON in these volumes.

(*b*) *Napoleon.* Make yourself familiar with the outstanding features of his life, as given on pages 4062-4066. The picture which this poem gives of him, his ambition, his moodiness, his sympathy with the boy, are all in accord with his true character.

(*c*) *Prone* here means *inclined forward.*

(*d*) *Lannes* was one of the bravest of Napoleon's marshals.

(*e*) *Vans* is an old word meaning *wings.* It is evident that Browning chose it to rhyme with *plans,* but he was very fond at all times of unusual words. Notice the compounds, *full-galloping, out-thrust, flag-bird,* which he coined.

(*f*) *As sheathes a film the mother eagle's eye.* The eagle, like some other birds, has a milky membrane which can be drawn over the eye at will, while the other lids are open. Scientists call this the *nictitating* or *winking* membrane.

4. Form the pictures in your own mind—that is, stage the little drama mentally.

5. Study the emotions which animate the characters. Napoleon shows *ambition, anxiety, joy in victory* and *sympathy;* the unnamed boy displays *heroism, pride* and *love* for his emperor.

6. Try to feel the inspiration of the poem—the natural pride in the heroism which could endure, smiling, the fate of this boy.

The Recitation. Such explanations as are given above should be made to the pupils when the lesson is assigned, that their appreciation of the poem may not be dulled by lack of proper background.

1. Have the poem read aloud, each stanza by a different pupil.

2. Watch for faulty expression, which indicates lack of comprehension. This will be far more frequent in this poem than in a simpler poem, as *The Village Blacksmith.*

3. Let the pupils indicate words, phrases or sentences which they do not understand.

4. Make a list of words which are unusual—which would not be used in ordinary prose. See whether you can tell why Browning used each one.

5. Draw from the pupils their ideas of the characters. A picture of Napoleon in the characteristic attitude described here will help. The boy's looks they must imagine. They will doubtless be inclined to picture him as too young. He was probably eighteen or twenty.

6. If the class is not too large, have each pupil read the entire poem aloud. It will give excellent practice in expression. The teacher should bear in mind, however, the caution given above—that it is *reading* and not *elocution* which is being taught; and only such dramatic power should be insisted upon as indicates an intelligent understanding of the poem and its emotions.

A.MC C.

Books for Parents. In the article LITERATURE is included a list of books for children. For parents who wish to fit themselves more fully for their great task, the following books are recommended:

Betts' *Mothers and Fathers;* St. John's *Child Nature and Child Nurture;* Johnson's *Education by Plays and Games;* Allen's *Home, School and Vacation;* Allen's *Making the Best of Our Children;* Bray's *The Town Child;* Mills' *The Mother Artist;* Scott's *How to Know Your Child;* Harrison's *A Study of Child Nature;* Gruenburg's *Your Child Today and Tomorrow;* Read's *The Mothercraft Manual;* Walker's *Child Culture and Motherhood;* Burbank's *The Training of the Human Plant;* Fisher's *Mothers and Children;* Forbush's *The Boy Problem in the Home;* Perry's *Recreation the Basis of Association;* and *The Parents' Guide,* published by the University Society of New York.

Related Subjects. The following articles in these volumes may assist the reader in the choice of interesting and helpful reading matter:

American Literature
Ballad
Bible
Biography
Canadian Literature
Drama
English Literature
Epic
Essay
Fable
Fiction
French Literature
German Literature
Irish Literature
Language
Literature
Lyric Poetry
Novel
Ode
Parable
Poetry
Prose
Romance

The articles on DICTIONARY and ENCYCLOPEDIA may also be consulted, as well as those listed as SPECIFIC REFERENCES in the index under LITERATURE.

READING, *red'ing,* PA., a prosperous manufacturing city, the county seat of Berks County, situated in the southeastern section of the state, on the Schuylkill River and the Schuylkill Canal. Philadelphia is fifty-eight miles southeast, and New York City is 126 miles northeast. Transportation is provided by the Pennsylvania, the Wilmington & Northern and the Philadelphia & Reading railways. In 1748 two sons of William Penn, the founder of the Pennsylvania colony, platted the town and named it for the English city of Reading. It was incorporated as a borough in 1783, became a city in 1847 and since 1913 has been governed on the commission plan. In 1910 the population was 96,071; in 1920 it was 107,784 (Federal census). The area was enlarged in 1867 and in 1869, and now exceeds six square miles.

Parks and Resorts. A number of electric and gravity railways wind about the mountains in the immediate vicinity of Reading, and make possible delightful excursions to various pleasure resorts. From the summit of Mount Penn (1,100 feet), crowned by a Chinese pagoda, and that of Neversink Mountain (800 feet), may be seen magnificent views of the surrounding country. Penn Common is the most attractive of the park reservations, which cover 295 acres. It has an immense rink for roller-skating in summer; in winter, this rink is flooded and used for ice-skating. Mineral Spring Park and the Zoölogical Garden also offer attractions to pleasure seekers, and the Schuylkill River provides boating and bathing.

Buildings and Institutions. Among the noteworthy structures of the city are the county courthouse, city hall, the post office, erected in 1887 at a cost exceeding $200,000, the Museum and Art Gallery, the $275,000 Y. M. C. A. building, the Natatorium, and a concrete via-

duct, completed at a cost of $600,000. There are two fine high schools, one for boys and one for girls, and for more advanced education, Schuylkill Seminary.

Industry. This locality is near large anthracite coal fields and great deposits of limestone and iron ore; the region also produces an abundance of fruit, grain and vegetables. Iron and steel are the greatest factors in the industrial life of the city, 8,500 men being employed in the eleven steel mills, the value of their annual output being estimated at $9,000,000. About 5,000 people are engaged in making knit goods and hosiery, and the immense locomotive and car shops of the Philadelphia & Reading Railway have about 3,000 men listed on their pay roll. The industrial wealth is further increased by a great variety of lesser manufactories and by the coal mines and limestone quarries in the vicinity.

READING, *red'ing,* **OF EARLEY,** *ur'li,* Rufus Isaacs, first Viscount (1860-), an English nobleman of Jewish descent, whose position among England's peers is the result of initiative and ability, not an accident of birth. Viscount Reading was born in London. His father, a prosperous fruit dealer, had him educated at the University College School in London, and in Brussels and Hanover. In 1887 he was called to the bar, and rose rapidly in his profession, becoming Queen's Counsel in 1898. Six years later he was elected to the House of Commons as a Liberal from Reading, and in 1910 was appointed successively Solicitor-General and Attorney-General, and was knighted. In 1912 he entered the Cabinet, and was a loyal supporter of Asquith's Home Rule policies. He was made Lord Chief Justice in 1913, in 1914 was created baron, and in 1916, viscount. He was made an earl in 1917. He headed an Anglo-French Commission to the United States in 1915, the mission of which was the negotiation of a $500,000,000 loan for the allies. In 1918 he returned to the United States as ambassador; in 1921 he became viceroy of India.

VISCOUNT READING
Lord Chief Justice of England.

REAGAN, *re'gan,* John Henninger (1818-1905), American political leader, best known for his work in framing the Interstate Commerce Act of 1887. He was born in Sevier County, Tenn., but at the age of twenty-one removed to Texas, which thereafter remained his home. He spent several years in campaigning against the Indians and in surveying the Indian country, but in 1848 settled down to the practice of law. A year earlier he had been elected to the Texas legislature, and in 1852 was elected district judge, a position which brought him an enviable reputation for his success in dealing with border ruffians of all kinds. He then served from 1857 to 1861 in Congress, resigning just before the end of his second term to take part in the Texas convention which passed an ordinance of secession.

Reagan was by that time a leader in the state; he was promptly elected to the provisional Confederate Congress, and in May, 1861, was appointed Postmaster-General of the Confederacy by President Davis. With Davis, he was captured by Federal troops near Irwinville, Ga., on May 10, 1865, and was imprisoned until October. The result of the war was accepted as final by him, and his views were expressed in a public letter, written from prison, in which he advised Texas to grant suffrage and other civil rights to the negro, thus forestalling the radical legislation which he saw was certain to come from Congress. This advice was not well received, but he soon reëstablished his popularity and served in the United States House of Representatives from 1875 to 1887 and in the Senate for the next four years. In the House, where he was for a decade the chairman of the committee on commerce, he was foremost as an advocate of Federal regulation of railways. His name, perhaps more than that of any other man, will always be associated with the government policy which was adopted in the Interstate Commerce Act of 1887; much of the law was practically his own work, and the rest of it showed his influence.

REAL, *re'al,* **ESTATE,** or **REAL PROPERTY.** Land, the trees, and the buildings upon it, and any minerals, such as coal, iron or stone, beneath the surface, are *real property.* In other words, *real estate,* or *real property,* consists of land and all property pertaining to it that cannot be removed without destroying it. The owner has a permanent right in real property, and at his death it descends to his lawful heirs. But when the sale of personal property does not bring in a sum sufficient to pay the

indebtedness of the estate, the administrator is required to sell sufficient real estate to make up the deficiency.

Real estate cannot be conveyed except by written contract. English law recognizes railway stocks or bonds as real property, but in the United States they are classified as personal property. The term *real property* came into use from the fact that in case of contest over the title the rightful owner received the *real* (actual) property and not a money equivalent.

Consult Washburn's *American Law of Real Property;* Leake's *Elementary Digest of the Law of Property in Land.*

Related Subjects. The following articles in these volumes should be read in connection with this topic:

Deed	Personal Property
Mortgage	Torrens System

REAPING, *reep'ing,* **MACHINE.** In 1920 about 66,000,000 acres of farm lands in the United States were devoted to raising wheat. Were all this land placed together it would form a vast wheat field, larger than the combined areas of Illinois and Indiana. With the old hand sickle a good reaper could reap an acre a day. There are about 7,120,000 farmers in the United States and Canada; if one-fourth of them could devote their time to harvesting the wheat crop by the sickle method it would require forty days to complete the harvest; before the expiration of one-half that time, however, a part of the crop would not be worth harvesting. Therefore under primitive conditions large crops were impossible. The present crops of the United States and of Canada and other wheat-growing countries have been made possible by the reaping machine, invented by Cyrus H. McCormick in 1831 (see McCormick, Cyrus H.).

The First Reaper. This was a crude machine, but it revolutionized the practice of grain growing. It was supported on two wheels, one being the king wheel, to which the gearing was attached. This wheel was of cast iron and had projections on its outer rim to keep it from slipping. The cutting part consisted of a horizontal steel plate called the *cutter bar,* which was six feet long, about five inches wide and half an inch thick. To this bar long steel points called fingers were riveted. The cutting was done by triangular knives attached to a steel bar which slid forward and backward in a groove in the fingers. A rapid motion was imparted to the knife bar by a crank operated by the gearing attached to the king wheel. A divider separated the grain that was to be cut from that left standing, and a reel bent the grain back against the knives, picking up the stalks that were bent or lodged, so that all the grain was cut. As the grain was cut it was laid on a platform, from which it was raked into gavels by a man following the machine. These were the essential parts of the first successful reaper.

The Modern Harvester. The modern harvester, or *self-binder,* has been developed from the original reaper. The first improvement consisted of a self-raking device which rakes the grain from the platform and dispenses with the labor of the extra man. Following this came the canvas belt which carries the grain over the king wheel to a box. From this box it is taken and bound by men riding on a platform attached to the machine. Then came the knotting device, an ingenious piece of machinery which enables the harvester to bind as well as cut the grain. In the self-binder the canvas belt carries the grain to the binding box, where it is packed until there is enough for a bundle. Then a catch sets the knotting apparatus in motion, and the bundle is firmly bound with twine and thrown from the box by a spring, lodging upon a platform or the ground, according to the plan of the machine. An ordinary harvester requires four horses to operate it successfully, and it will harvest ten acres of grain a day. It can be used with equal success in harvesting wheat, oats, barley and rye. On some of the largest farms traction engines are used for operating the machines, one engine hauling several machines.

The *header* is a modified form of harvester, used in regions where the grain is well dried before harvesting. It cuts the grain just below the heads, which are carried by an elevator to a storage box on the machine or to a wagon drawn beside it. The heads are stacked until dry enough to thrash. Headers are used to some extent where dry weather precedes the harvest. In California, Oregon and Washington and in some parts of Western Canada a combined header and thrasher is used. Here the grain can stand until it is thoroughly dry, when it may be harvested, thrashed and put into sacks ready for market without rehandling. A harvester cuts a swath twice as wide as a reaper, and a combined harvester and thrasher requires from twenty to twenty-four horses to operate it.

Probably no other invention has contributed so much towards increasing the food supply of the race as the reaping machine. The largest

manufactories of these machines are in and about Chicago. Harvesters are now found in every wheat-growing country; it is estimated that over 2,000,000 of them are in operation in the world. Somewhere on the fertile earth the whir of the harvester may be heard every day in the year. See MOWING MACHINE. W.F.R.

Consult Ardrey's *American Agricultural Implements;* Stabler's *Overlooked Pages of Reaper History.*

REASON, *re'z'n,* or **REASONING.** Reasoning is sometimes called the third, or final, step in thinking. It consists in comparing two judgments or propositions and forming a conclusion as to their agreement or disagreement. In formal reasoning the general proposition is called the *major premise,* and the special proposition the *minor premise.* The *conclusion* is made on the ground of the major premise. These premises and the conclusion form the *syllogism,* which may be stated as follows:

All wood floats.
This object is a piece of wood.
Therefore, this object will float.

Ordinarily the general proposition is not stated, because a knowledge of it is taken for granted. We say that this piece of wood will float because it is generally known that all wood floats. The validity of the conclusion rests upon the validity of the general proposition and the care with which the comparison has been made. The validity of the conclusion in the example given is beyond question, because the truth of the general proposition has been established for centuries, and the object in hand was wood; but had the object been iron painted to resemble wood the conclusion would not have been valid. Many false conclusions are drawn because of hasty and careless observation. Altogether too many people reason like this:

All crows are black.
This bird is black.
Therefore, this bird is a crow.

The reasoner fails to take into consideration the fact that other birds besides crows are black, and it is possible that he has classified a blackbird as a crow. He has also overlooked the further fact that other characteristics besides color must be considered in classifying birds. Such hasty conclusions are what we commonly call *snap judgments.*

In the process of reasoning one judgment logically leads to another. We arrive at our conclusion *because* of the relation of the propositions compared. The general proposition is a truth which has been established through long and extensive observation, not simply of one individual but of many, and is based upon all the facts learned through these observations. Sometimes further observation leads to the discovery of new facts which modify the general proposition. Then all conclusions based upon it must also be modified.

General propositions are formed by *inductive* reasoning, and conclusions are arrived at through *deductive* reasoning. These processes are explained under INDUCTIVE METHOD and DEDUCTIVE METHOD.

Cause and Effect. The person with a well-trained mind has his knowledge so classified that he reasons from cause to effect. When a washerwoman says, "It is going to rain; I must take my wash in," she is acting from what she has learned through past experiences. This process of reasoning, however, is the same as was that of Newton, when, from observing the fall of the apple, he reached the conclusion that all the heavenly bodies attract each other. The difference in the problems is in the vastness of their application. We also reason from effect to cause. When we find pools of water in the road in the morning, we infer that it rained during the night because we know that rain causes such an effect. In both cases the same relation of proposition is maintained.

Independent Thinking. A great majority of people accept without question the conclusions of others instead of thinking out their own problems and arriving at their own conclusions. Pupils in school rely upon the teacher and upon their classmates for the solution of problems in mathematics, the analysis of sentences in grammar and for any other help they can get. The result of so much assistance is that when they leave school these young people are sadly lacking in that mental vigor that they need in solving the problems of life. Parents and teachers should train the children under their charge to do independent thinking and logical reasoning. W.F.R.

Consult Pillsbury's *Psychology of Reasoning;* Sully's *The Human Mind.*

Related Subjects. The reader is referred to the following articles in these volumes:

Deductive Method	Judgment
Inductive Method	Thought

RE'BATE, in mercantile law, is the same as discount, such as deducting the interest for prompt payment, or giving a certain per cent off for cash, or offering a definite reduction to secure favors or good will.

Rebates to shippers by transportation companies is a common method by which these companies once discriminated between shippers. The practice is unlawful, and common carriers convicted of it are subject to heavy fines. A contract to procure rebates from railroads for the shipper is void because unlawful, but this fact does not invalidate the contract for shipping, nor release the common carrier from liability on its bills of lading. See INTERSTATE COMMERCE ACT.

REBELLION, *re bel'yun,* **OF 1837,** the attempt of the Radicals in Upper and Lower Canada to introduce by force of arms the principle of responsible government. In the quarter of a century following the War of 1812 many reforms had been secured in the Canadas, but responsible government was still withheld. The Radicals, or Reformers, had only two courses open to them; either they could continue to exert a steady pressure by constitutional means, or they could resort to arms in rebellion. In the Maritime Provinces the extremists among the Reformers were not influential, but in the two Canadas the leaders of the reform cause were extremists who were brilliant and courageous, but lacking in a sense of proportion. William Lyon Mackenzie in Ontario and Louis J. Papineau in Quebec are unique figures in history. Both of them were disappointed in their efforts to gain their ends by peaceful means, and both chose open rebellion. They may have been wrong in encouraging the more excitable of their followers to this step, and there is even some evidence that Papineau was not in favor of open revolt, but they deserve whatever credit comes to brave men, men of ideals, who allow their devotion to an end to obscure the doubtful character of the means.

In Lower Canada. In Quebec, or Lower Canada, as it was then called, there was almost from the beginning of British rule a party of discontent. After the War of 1812 this party increased rapidly in influence, and for two decades there was almost constant friction between the legislative assembly on the one hand, and the lieutenant-governor and the legislative council on the other hand. In the assembly the discontented French element had a large representation. The lieutenant-governor and his council were British. Into this conflict of race were interjected other issues, notably the question of maintaining the French language and the Roman Catholic religion. Later the assembly demanded full control of the purse strings, and when other methods failed, simply declined to appropriate funds. Lastly there came a demand for an elective legislative council.

In 1835 the British government sent a commission to investigate the situation. This commission recommended that the assembly be allowed full control over the provincial revenue, but advised against an elective council. The British government thereupon declined to grant an elective council or a responsible government, and, moreover, as the assembly had refused to appropriate funds, instructed the Governor-General to withdraw the necessary funds from the provincial treasury. This interference provoked rebellion. Public meetings of protest were held, the "Sons of Liberty" were organized, and the rebels began to muster at Saint Charles and Saint Denis. Associated with Papineau as leader was Dr. Wolfred Nelson (which see). The rebels met a strong hand. The rebel army at Saint Charles was routed in a battle of no consequence, and the news of this defeat was enough to scatter the forces at Saint Denis. Smaller groups of the rebels made a hopeless stand in several villages north of Montreal, but the rebellion was over practically at the first blow. Almost at the beginning of the disturbance Papineau fled to the United States.

In Upper Canada. In Upper Canada events followed a similar course. Mackenzie, breaking with Baldwin and the moderate Reformers, issued a proclamation setting forth the grievances of the people and renouncing allegiance to Great Britain. As "Chairman *pro tem* of the Provisional Government of the State of Upper Canada," he called on the people to rise, the plan being to capture the military stores in the Toronto city hall. Four hundred rebels met a slightly larger force of militiamen, were routed after a skirmish, and the plan failed.

Mackenzie with some of his followers fled to an island in the Niagara River just across the United States border. There they established a "provisional government." The "Patriots," as they called themselves, received their supplies by the steamer *Caroline.* One night a band of Canadians, under instructions from Colonel Allan MacNab, rowed out to the *Caroline,* set it on fire, turned it adrift and sent it over Niagara Falls. Mackenzie soon afterward abandoned the island and gave up the pretense of rebellion.

Results of the Rebellion. From a military point of view the rebellion was a joke. The rebels in the two provinces acted in coöperation, but not closely enough to constitute a

serious menace. The rebellion failed because Papineau and Mackenzie misjudged the feelings of the majority of the people. The rebels were representative neither of the French-Canadians nor of the Reformers. The rising gave reform a temporary setback, yet it had at least one important and favorable result. It caused the British government to send the Earl of Durham (which see) to Canada. Durham issued a report which is perhaps the most remarkable document in the history of Canada. Its result was the Act of Union of 1840 (see UNION, ACT OF). W.F.Z.

RECALL, THE, an advanced principle in government which makes it possible for voters to deprive a man of a public position before the end of the term for which he is chosen. It had its origin in the theory that what the people have done they have the right to undo, provided they find they erred originally.

The voters put into office a man who promises to conduct affairs pertaining to his position with honesty, discretion and such ability as he possesses. Sometimes after he is seated obligations mean less to him than personal ambition; possibly he cannot resist the insistent pressure of special interests, demanding favors to which they have no right. By the operation of the recall it may be possible to rid a community of such an unfaithful official. Legislative authority or constitutional provision must first legalize the recall. It may apply to cities only, or its scope may be broadened to include counties and states.

If it is desired to force an official from his post a petition must be signed by the required number of voters—varying from twenty to thirty per cent of those who voted at the last preceding election—whereupon the election commissioners name a day for the recall and election of a new official. The accused and accusers each may place 200 words upon the ballot, the one explaining why he should not be recalled, the other giving reasons why the accused should no longer serve. The names of candidates for the position appear with the name of the incumbent whose post is in jeopardy. The result of the ballot may vindicate the incumbent, in which case he will retain his place until the end of his term. If the majority expresses a lack of confidence in him and gives another man a larger vote he is automatically unseated, and his successor at once assumes the office.

As first put into operation, the recall applied only to officers elected by direct vote of the people, but it is gradually widening its scope to include appointive positions, and even to the recall of judges. The best sentiment appears to be unfavorable to the latter provision, for it might seriously affect the independence of jurists and incline them towards decisions which might be popular but not just.

Switzerland originated the recall over a century ago. In America the first recall law was adopted in 1903 by Los Angeles, Cal.; the second city to favor it was Seattle, Wash., in 1906. Other cities, to the number of over a hundred, and nearly twenty states, had adopted the measure before the end of 1917. See INITIATIVE AND REFERENDUM. E.D.F.

Consult Phelps' *Selected Articles on the Recall;* Beard's *Documents on the Initiative, Referendum and Recall.*

RECEIPT. George Evans, a retail grocer in Muncie, Ind., sold goods to Charles Miller, on account, with the understanding that Miller should pay his account the first of every month. On Oct. 1, 1917, Miller's account amounted to $15.75, which he paid in cash, and for which Evans gave him the following receipt:

$15.75 Muncie, Ind.,
Oct. 1, 1917.

Received of Charles Miller
Fifteen.....and 75/100 dollars
In full of account to date.
GEORGE EVANS.

We learn from the above statements that a *receipt* is a written acknowledgment of the payment of money. It is also a written acknowledgment of receiving any property named in the receipt. Receipts are of three kinds: *receipts in full,* like the one above; *receipts on account,* given when only a portion of the amount due is paid, and *receipts to apply on special accounts.* A receipt should always show whether payment is made in full, on account, or on the special account to which the payment is applied when there is more than one account between the parties. A receipt should be given whenever an account is paid. A bill marked *paid* constitutes a receipt. No receipt is required when a note is paid, since the canceled note is the receipt.

RECEIVER, *re se' ver,* one who is appointed by a court to have custody, management or disposal of property under litigation or of property owned by an incompetent person. The conditions most frequently leading to a receivership are these:

1. Incompetency, that is, cases in which property is held by a person under legal age to act

for himself, and cases of insanity. When there is no legal guardian a receiver may be appointed.

2. Disagreement among partners. When the disagreement reaches a stage that makes it impracticable to continue the business under the existing management a receiver is usually appointed to manage the business or to close it out.

3. Insolvency, either of a firm or a corporation.

A receiver is appointed when one party to the controversy applies to a court having jurisdiction in the case. The applicant must prove the reasonableness of his petition. A hearing is then appointed at which the defendant is given opportunity to show why the petition should not be granted. If the petitioner is sustained the receiver is appointed. The receiver is an officer of the court and is limited in his authority and acts by the decree appointing him and by the laws of the state governing receiverships. He is a disinterested party and is required to administer the business committed to his charge in the interest of all parties related to it. Under receiverships, where there is danger of insolvency, profits must first be applied to the payment of indebtedness.

The receiver cannot bring suit without consent of the court. Nor can any other court of concurrent jurisdiction bring suit against him without consent of the court by which he was appointed. Suit, however, may be brought through a superior court. A receivership terminates when the work of the receiver is completed, and he is formally discharged by the court. The receiver is entitled to compensation for his services, and his claims, together with the necessary expenses of the receivership, constitute a first lien on the property. Before assuming his duties he is required to file a bond in such amount as may be fixed by the court.

Consult High's *Treatise on the Law of Receivers;* Kerr's *Law and Practice as to Receivers.*

RECIPROCITY, *res i pros'i ti,* in a broad sense means exacting and giving equivalent treatment, but as used in connection with tariff legislation the word has acquired a special meaning. It refers to the policy of advancing international trade by means of treaties which grant mutual trade concessions. A reciprocity treaty says in effect: "The tariffs of our country are as printed; however, if on certain of your products you lower your tariff for us, we will make corresponding reductions in certain of our schedules for you." Every nation is compelled to raise revenue, in most cases by means of a tariff levied on certain of its imports. Within the last half century, great use has been made of tariff schedules as a base on which to rest reciprocity treaties.

Consult Allin and Jones's *Annexation, Preferential Trade and Reciprocity;* Robbins' *Selected Articles on Reciprocity.*

RECLAMATION, SERVICE, *rek la ma'shun,* a term which covers the work of a government in redeeming arid and semiarid lands; in a broad sense it includes the guardianship of public lands, forests and mineral deposits. This subject is discussed in these volumes in its world-wide aspect in the article CONSERVATION. See also list of related subjects at end of that article.

RECONSTRUCTION, *re kon struk'shun,* the process by which the states forming the American Confederacy regained the status they enjoyed before the War of Secession. The process of reconstruction was begun by Lincoln, according to a theory of his own. He held that the rebellion in each state was organized by an element within the state, and that none of the states had really left the Union. Normal relations would be restored as soon as the loyal elements assumed control of the various governments. The problem appeared to Lincoln as essentially one for the executive rather than for Congress to solve, because it called for a general exercise of the pardoning power, which rested only with the President. It is a matter of doubt whether this view could have been enforced without serious friction between Congress and the executive, even if Lincoln had lived. Adopted after Lincoln's death by President Johnson, a man of insufficient force and tact, it failed to win the support of an effective majority in Congress, and resulted in friction that ended in his impeachment.

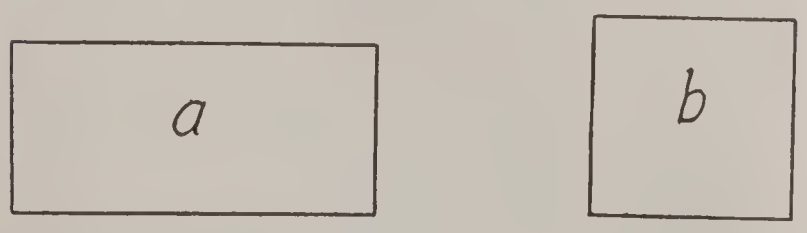
Johnson's first efforts met with partial success, owing to a Congressional recess. He appointed military governors in North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi and Texas. Conventions were held which repealed the ordinances of secession and framed new state constitutions. Legislatures were chosen which, except in the case of Mississippi, ratified the Thirteenth Amendment, abolishing slavery. When Congress met in December, 1865, the Senators and Representatives of the Southern states were waiting to be seated. Instead of seating them, Congress appointed a committee to recommend on what terms the rights of the late seceded states should be restored. Johnson retaliated by a speech that wholly alienated Congress, which began a series of legislative acts designed to

protect the negroes from legislation in the Southern states.

By the act of March 2, 1867, the South was divided into five military districts, with a major-general of the Union army in command of each. Protected by Federal troops, the negroes participated in framing legislation and controlling the government—a task for which they were ludicrously unprepared. The result was incredible waste and extravagance. Unscrupulous politicians from the North, called *carpetbaggers,* because it was supposed they could crowd all their worldly goods into the carpetbag valises they carried, organized the negro vote in their own interests. The result was negro domination, administrative chaos, a great deal of insolence and no little violence. Although President Grant continued to follow the Congressional policy during his term, a saner attitude soon came to be adopted. All the states were restored to the Union by 1870, and an amnesty act, passed in May, 1872, removed all political disqualifications. Public opinion in the North had shifted; the wisdom of moderation was recognized, and when President Hayes removed the army from the states involved, what the South has always regarded as the "crime of reconstruction" was at an end.

Consult Davis's *The Civil War and Reconstruction;* Fleming's *Documentary History of Reconstruction.*

RECTANGLE, *rek'tang g'l.* A plane figure bounded by four straight sides whose opposite



RECTANGLES

(*a*) The form of the figure ordinarily called a rectangle; (*b*) is a square, but it is also a rectangle.

sides are parallel and therefore equal, and whose angles are right angles, is a *rectangle.* It is the latter qualification which makes the term a more restricted one than *parallelogram* and which gives to the figure its name, for *rectangle* means literally *right-angle.* If the four sides of a rectangle are equal, the figure is a square, as shown in the above illustration. See MENSURATION; QUADRILATERAL.

RED, the first of the seven colors of the solar spectrum, and one of the three primary colors, the others being blue and yellow. It is used commonly in dyeing and in the arts. Among the best-known red coloring matters are carmine, vermilion, red ochers, madders and certain coal-tar products. In the three- and four-color processes of reproducing colored pictures (see PRINTING, subhead *Color Printing*), red is one of the colors employed. In nature it is seen in various shades and hues in the bloom of such flowers as the rose, the poppy and the geranium, in various minerals and in the plumage of many birds. In the article COLOR in these volumes the reader will find a discussion of the various colors and a color plate showing those shades which have red in their composition. See also LIGHT, subhead *The Spectrum.*

Red, being the color of blood, is the symbol of passion. The red flag is the standard of the Social Democrats in Europe and of anarchists in America. Red occurs in the national flags of many nations, and is one of the three colors in the Stars and Stripes (see colored plate of flags accompanying the article FLAG). A red cross is the symbol of the world's greatest organization for work of mercy (see RED CROSS SOCIETIES).

RED'BIRD, the common name for all birds of red plumage. In the United States, cardinals and the scarlet tanager, and sometimes the European bullfinches, are called redbirds. See CARDINAL BIRD; TANAGER.

RED CEDAR, *se'dar,* a species of juniper tree whose durable wood is used extensively in making lead-pencil casings, posts, railroad ties, chests and other useful objects. It is distributed widely in North America, being found from Nova Scotia to Georgia and west to the foothills of the Rocky Mountains. The red cedar sometimes grows as a low shrub and sometimes as a tree one hundred feet high, taking the latter form especially in the lower Mississippi Valley. Almost every part of the plant is fragrant—the wood, the leaves and the small blue-gray berries. See JUNIPER.

REDCLIFFE, a town in southeastern Alberta, on the main line of the Canadian Pacific and on the South Saskatchewan River. It is six miles northwest of Medicine Hat, with which it has connection by auto-bus as well as by railway. Because of the abundant supply of natural gas in the vicinity, Red Cliff has become an important manufacturing center, its chief products being bricks, ornamental iron, glass, sashes and doors, shoes, gloves and cigars. The town was founded in 1910, and on June 24, 1915, was partly wiped out by a cyclone, but was soon rebuilt. Population in 1911, 220; in 1921, 1,137.

RED CROSS SOCIETIES, a general name for a group of organizations throughout the enlightened parts of the world whose object, originally, was solely to render aid to sick and wounded soldiers on battle fields and in military hospitals, in time of war. Their mission was to supplement with their trained physicians and nurses the work of the regular military organization. Nations are not usually in a state of war, and the Red Cross, as it is familiarly known, not many years after its organization also found exercise for its humanitarian impulses in relieving distress due to great calamities, such as earthquakes, great fires, famines and the like.

The societies are not officially connected, but they work in harmony through the International Committee for the Relief of the Wounded in War. The various societies are identified by the words *British Red Cross, German Red Cross, Italian Red Cross,* etc., thus certifying to the national character of the organizations. The movement to prevent needless suffering in war has become so popular a part of the world's work that forty-three powers have bound themselves by treaty to respect the Red Cross and preserve its absolute neutrality when in service. So the organization knows no nationality when on errands of mercy. In the great War of the Nations Red Cross nurses of each contending nation attended without discrimination, on the battle field and in hospitals, the wounded of all other nations. On the battle field, even on the firing line, the work of the Red Cross men and women was heroic.

The Red Cross Society of each nation is supported either by government appropriations or by voluntary contributions, or by both. There is a single symbol of the organization throughout the world, with one exception, noted below; this speaks to all men in a universal language—a red cross, with wide arms of equal length, on a square, white background. Wherever that flag floats, wherever it is seen painted on ambulances, or where it is merely a square of cloth sewed to the left sleeve, it commands neutrality and respect; when gunfire is going on, gunners must direct their fire so that members of the Red Cross may not be purposely endangered. There were numerous charges during the War of the Nations that this rule was violated, or that the flag was used by combatants to deceive the enemy and screen hostile demonstrations, but the world hesitates to believe such reports.

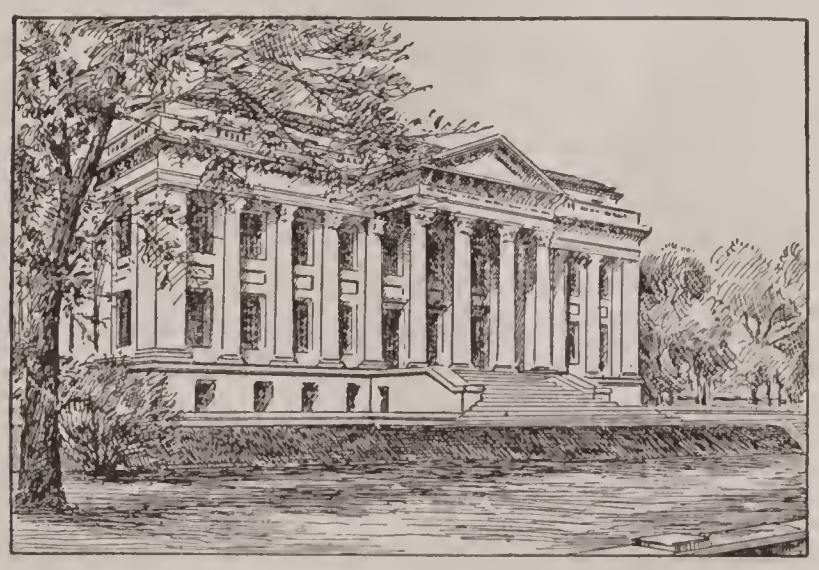
Historical. The movement was started with an unofficial international conference, held at Geneva, Switzerland, in 1863. The next year fourteen nations negotiated a treaty which led to the formation of the first societies. In 1866, in the Seven Weeks' War, in Germany, Austria and Italy, the Red Cross Societies were first actively engaged. Austria contributed $500,000, Germany, $3,000,000, and 500 volunteers entered the service. In 1870 Germany contributed more than $14,000,000 to be used by the societies caring for the sick and wounded in the Franco-German War; France gave $2,000,000, and its societies ministered to more than 100,000 wounded men. In 1877-1878 Turkey, Greece, Russia, Serbia and Montenegro were embroiled in the Russo-Turkish War; the Red Cross raised $17,000,000 to provide necessaries and attention for the sufferers. In the Russo-Japanese War of 1904-1905 the efficiently organized Japanese Red Cross bore the heaviest burden; in the War of the Nations the Japanese Society also furnished a corps of about fifty physicians and nurses for service in Europe. In the Spanish-American War of 1898 the American Red Cross raised by subscription $4,000,000. From 1914 to 1917 $3,523,297 were expended for European war relief.

The operations of the Society in the War of the Nations attained a most remarkable degree of efficiency. It was the greatest opportunity for service in the world's history, and the Red Cross more than justified the confidence the

nation had reposed in it. During the war, from all sources, the people of the United States gave the Society over $315,000,000. In addition to this, the labor they performed in its behalf was stupendous. Up to July 1, 1918, the women of the American Red Cross Chapters had produced 221,282,838 articles needed by the Society in France, including refugees' garments, hospital supplies, knitted articles and surgical dressings. The total number of articles prepared before the armistice was almost 300,000,000. American women were truly soldiers at home; the money value of their services is beyond estimate.

In Canada the ardor of the Red Cross kept pace with the Dominion's gift of its hundreds of thousands of men sent to the help of the mother country. The Canadian Society is not a branch of the British Red Cross Society, but is a separate chartered organization.

Organization in the United States. The American Red Cross Society was incorporated by the Congress of the United States in 1905, by which act the government practically assumed the right to control its operations; for



AMERICAN RED CROSS BUILDING AT WASHINGTON, D. C.

the law which effected the incorporation dissolved the first organization, which had been established by Clara Barton in 1881. The President of the United States is President of the American Red Cross Society, but its detailed operation is in the hands of officers of a committee whose chairman is named by the President. Every dollar given to it must be accounted for to officials of the government.

In 1913 Congress voted $400,000 towards the erection of a national Red Cross building in the city of Washington, conditioned on the raising of an additional $300,000 by the Society. The task was easily accomplished.

The Turkish Red Crescent. The only nation which ever opposed the Red Cross is Turkey, an opposition due solely to religion. The Mohammedan is bitterly hostile to the Christian, whose religious symbol is the Cross. When in Turkey, by consent of the world's societies, the Red Cross was replaced by the Mohammedan Crescent, but without change in theory or practice, the Turkish Society began a more or less efficient career. The work of the Red Cross except in the late war has been negligible in Turkey.

The Red Cross in Peace. In all countries the Society is a humanitarian arm which alleviates distress in all forms. Its motto is, "In time of peace and prosperity, prepare for calamity." It is therefore always ready, always alert. Some of its heaviest expenditures in recent years were in connection with the following events:

1906—San Francisco fire	$3,087,469
1906—Japanese famine	245,855
1908—Messina (Italy) earthquake	985,300
1912—*Titanic* wreck victims	125,933
1913—Ohio floods and storms	2,472,287
1916—U. S. National Guard, Mexico	100,000

Scarcely a month passes without a call for Red Cross aid from some desolated section of the country. G.W.G.

Consult Barton's *Story of the Red Cross;* Vivian and Williams' *The Way of the Red Cross.*

RED DEER, a city in the central part of Alberta. It is almost midway between Calgary and Edmonton, being ninety-five miles north of Calgary and ninety-nine miles south of Edmonton. Red Deer is a division point on the Calgary-Edmonton branch of the Canadian Pacific, and is also located on the Alberta Central and on the Brazeau branch of the Canadian Northern. There is some traffic, in scows only, on the Red Deer River, which flows through the city. Population in 1911, 2,118; in 1921, 2,328.

Red Deer, which took its name from the native deer of the vicinity, was founded in 1880, and was incorporated as a city in 1913. It adopted the commission form of government in 1907. It is the distributing point for the mixed-farming region of Central Alberta, and every year ships thousands of pounds of butter and milk as well as hogs, cattle and poultry. There are large brick yards, creameries and cheese factories, tent and mattress factories. The Roman Catholic convent, municipal hospital and the armory are conspicuous buildings. The city has several attractive parks, including Waskasoo, and several summer resorts are in the vicinity.

RED'FISH, the name applied to several drum fishes, particularly to the *red drum,* or

channel bass, a game fish abundant in the Atlantic coast waters of the Southern United States. The skin of this handsome fish is gray, with a coppery iridescence; sometimes it grows to be five feet in length and weighs seventy-five pounds, but usually it is much smaller. It is esteemed as a food fish, and is one of the most valuable products of the Texas fisheries.

The term is also applied to a red fish of Southern California, a richly colored fish with a thick, compressed body. It is of a crimson color, shading to blackish-purple on the fins; it is about three feet long and weighs from thirteen to fifteen pounds. Because of the fatty lump on its blunt forehead, this fish is also called the *flathead.* It is caught in the kelp beds near the shore, and its flesh is prized as a food, especially by the Chinese, who dry and salt it.

Redfish is also the Alaskan name for the red or blue-black salmon. See SALMON.

RED'LANDS, CAL., a city of much natural beauty, in the southern part of the state, noted as one of the largest orange-shipping centers in the world. It is in San Bernardino County, sixty-five miles east of Los Angeles and ninety miles north of San Diego, on the Southern Pacific, the Atchison, Topeka & Santa Fe and the Pacific Interurban (electric) railways. The place was settled in 1881, was incorporated in 1888 and was so named because of the red soil of the locality. In 1910 the population was 10,449; in 1916 it was 14,000 (Federal estimate). The city has an area of sixteen square miles.

From the heights back of Redlands, which is 1,300 feet above sea level, a magnificent view is had of its gardens, with their profusion of riotous coloring, and of the vast fields of grain, and orange and lemon groves, extending to the mountain slopes, which are covered with forests and capped with snow. Smiley Heights is the most famous of the city's twelve parks. Many of the homes, schools, churches, hotels and clubs of Redlands are of a unique style of architecture. The largest of these are the buildings of the University of Redlands, established in 1909; it has a campus of sixty-three acres adjoining Sylvan Park. The A. K. Smiley Public Library, containing 27,000 volumes, presents the appearance of a palatial home in a park setting.

An immense letter "R," 540 feet long and 360 feet wide, on the side of Mount Harrison, and visible for sixteen miles, was cut by the students of the university, and it is the task of the freshmen each year to keep the letter free from young shoots. Redlands is a residential city, rather than a commercial center, and the people are employed for the most part out-of-doors in growing, picking and packing fruit. About 5,000 carloads of oranges, lemons and grapefruit are shipped from here annually. Over 1,000 tons of dried apricots and 6,500 gallons of olive oil are produced in a year, and the yield of almonds and dates is also considerable.

RED'MOND, JOHN EDWARD (1851-1918), an Irish political leader, born in Dublin and educated at Trinity College in that city. He studied law and was called to the bar in 1886, five years after his election to Parliament for New Ross. After 1891 he represented Waterford City. Redmond's influence grew steadily in the House of Commons, and at the time of the rupture of the Irish party which followed the Parnell scandal, he pleaded eloquently for the discredited leader.

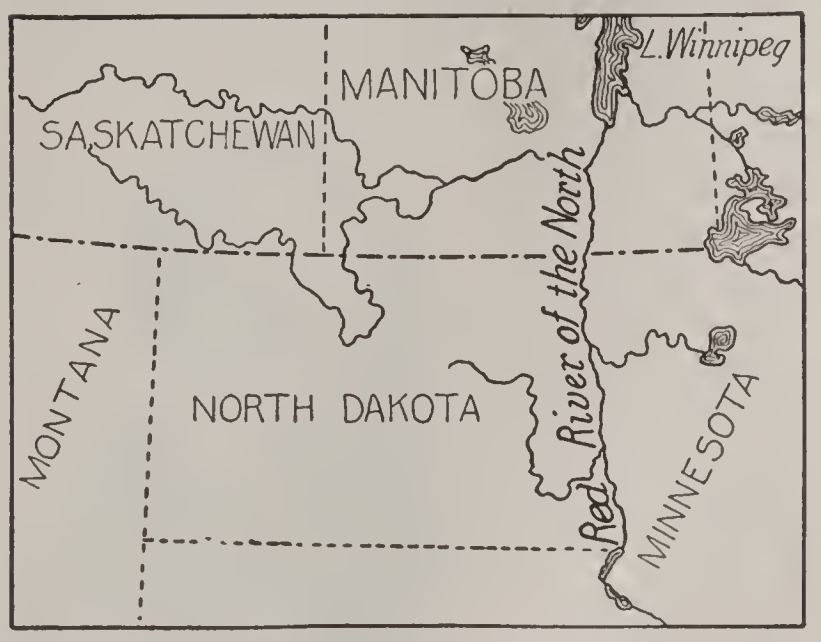
JOHN E. REDMOND

On Parnell's death he became head of the Parnellites, and as such kept up a bitter antagonism to the other section of the Irish party. In 1900, however, when the two sections joined to form a new Nationalist party, he became the accepted leader, and has taken a prominent part in all the subsequent movements relating to the question of Irish Home Rule. In 1915 he was offered a place in the Coalition Cabinet, formed for more effective prosecution of the war, but he declined the honor. See HOME RULE.

RED RIVER, the southernmost of the more important tributaries of the Mississippi, has its source in several head streams of Northern Texas. The main stream follows an easterly course between Texas and Oklahoma, enters Arkansas, and, cutting off the southwestern corner of that state, flows southeasterly through Louisiana until it reaches the Mississippi. The two rivers unite 341 miles above the mouth of the Mississippi. The Red River has a length of about 1,200 miles and its drainage basin covers 89,970 square miles. For seven months of the year light-draught boats ascend the river to Shreveport, 350 miles above its junction with the Mississippi, and in periods of high water

they can go almost as far north as Texas. The middle reaches of the Red River are in a heavily forested region, and there the stream is subject to clogging by floating tree trunks and driftwood. Since 1873 the government has kept the channel clear by removing the timber as fast as it accumulates.

RED RIVER OF THE NORTH, a river of the United States and Canada, one of the three great rivers which flow into Lake Winnipeg and thus form part of the Saskatchewan-Nelson system. Practically its whole course lies through



COURSE OF THE RIVER

a level plain which was in prehistoric times the bed of Lake Agassiz. This plain, the Red River Valley, is one of the richest wheat-growing areas in the world. The river itself has been utilized in the production of power for manufacturing in the cities along its banks. Among these communities are Fargo and Grand Forks, the two largest cities in North Dakota, and Winnipeg and Saint Boniface, cities in Manitoba. The river is navigable from Grand Forks to Winnipeg, but is of comparatively little importance as a commercial highway. About 100 miles of its course is in Manitoba.

The Red River rises in the west-central part of Minnesota, only a few miles west of the headwaters of the Mississippi. After describing a small curve to the south and west, it turns northward at Wahpeton, N. D., and for about two hundred miles forms the boundary between Minnesota and North Dakota. At Wahpeton it receives a branch from the south, the Bois de Sioux River, which forms the remainder of the boundary between Minnesota and North Dakota and extends for a few miles as the boundary of South Dakota. The source of the Bois de Sioux is Lake Traverse, from which also issues the Minnesota River, a tributary of the Mississippi. At high water small vessels may occasionally pass from the Mississippi to Lake Winnipeg. The principal tributaries of the Red River are the Sheyenne and Pembina in North Dakota and the Assiniboine (which see) in Manitoba; these all flow into the main stream from the west.

Lake Agassiz. The drainage basin of the Red River comprises an area of 63,400 square miles. During the Glacial Period this entire region was covered by a vast lake, which was prevented from reaching its natural outlet to the north by the great ice sheet. The lake discharged at its southern end into the Minnesota River. At one time this lake, which is called Lake Agassiz, was larger than all of the present Great Lakes combined, but as the ice sheet receded it gradually disappeared and the Red River again flowed northward. Lakes Winnipeg, Winnipegosis and Manitoba are remnants of Lake Agassiz. The bed of the lake is covered with glacial silt, which is extremely fertile, and its shore lines are still well marked for miles.

RED RIVER REBELLION, an uprising of the half-breeds in the Red River Valley against the Canadian government in 1870. In 1869 the Hudson's Bay Company transferred its territorial rights in Rupert's Land (which see) to the British government, and the latter in 1870 transferred Rupert's Land to the Canadian government. At that time the only occupants of the great Northwest were Indians, a few scattered traders, and about 12,000 settlers in the Red River Valley. Of these settlers nearly eighty-five per cent were half-breeds or *métis*. They lived a simple agricultural life, on lands to which they had no legal title; when they tired of a plot of ground they moved to some other spot which suited them.

Under the beneficent despotism of the Hudson's Bay Company the half-breeds had lived much as they pleased. On this community there suddenly descended, without warning, a mob of bridge and road builders, surveyors and officials of all kinds. Their lands, which were arranged on the old French plan of strips reaching back from the river fronts, were now to be arranged in townships and sections. The first thought of the half-breeds was naturally that the new government would disregard their interests. Amid the general excitement it was no wonder that the fear and discontent of the métis should find expression.

The center of the storm was Louis Riel (which see). When news came to the valley that the Hon. William McDougall was on his

way to assume the governorship of this new territory, Riel and his followers determined to prevent him, if possible, from organizing a new government. The métis seized Fort Garry (now Winnipeg), set up a "provisional government," and prepared to resist the authority of the Dominion government. McDougall was stopped at the boundary of Rupert's Land, and was forbidden to enter. Fortunately he had the good sense to see that the métis had a real grievance and obeyed Riel's order as a means of preserving peaceful relations.

But an inexplicable act of Riel's ended the prospect of a friendly settlement. In order to terrorize his opponents, Riel imprisoned a few "enemies of the provisional government," among them a young fellow named Thomas Scott. For some reason Scott was picked as an example, was condemned as a traitor to the provisional government, and was shot. This was cold-blooded murder, and created tremendous indignation in Eastern Canada. Under the command of Colonel Garnet Wolseley a force of 700 men, both regulars and volunteers, made the long and wearisome journey westward by way of Lake Superior. At the approach of the troops Riel seemed to lose all joy in his office as head of the "provisional government" and promptly fled to the United States. His flight ended the rebellion.

Even while Wolseley and his men were marching westward, the Dominion Parliament admitted Manitoba as a province of the Confederation. The claims of the half-breeds were met by setting aside 1,400,000 acres for their use. Unfortunately many of the half-breeds continued to wander westward, and a few years later again caused difficulty. See SASKATCHEWAN REBELLION. W.F.Z.

RED SEA, an arm of the Indian Ocean, about 1,200 miles long, which separates the Arabian Peninsula from Northeastern Africa (see colored map of Asia, following page 416). Since the construction of the Suez Canal (which see), the Red Sea has been the great water highway between Europe and the Orient. It has many disadvantages as a trade route, because, except for a central channel twenty miles wide, the sea is very dangerous even to small vessels, and the climate is damp and made intensely hot by the burning winds off the African desert; yet, were it not for this passage the enormous volume of trade between the European countries and Japan, China and India would follow an overland route, as it did centuries ago, or proceed by way of the Cape of Good Hope. The sea is long and narrow, never exceeding 200 miles in width, and its average depth is about 2,000 feet.

Geologically, the Red Sea is nothing but a great crack in the solid rock that has filled up

THE RED SEA

with water. The shore is barren, and there are few harbors. On the east are high mountain ranges, on the west low sand hills and rocky table-lands, skirted by coral reefs. Because of the great evaporation resulting from high winds and the excessive heat, and owing to the fact that, until the opening of the Suez Canal, the Red Sea was practically an inland sea, its waters are very salty. The story of the passage of the Children of Israel across this sea is one of the most interesting of Bible narratives. It is told in *Exodus* XIV.

Various explanations are offered for the origin of the name *Red.* Among these are the color of the surrounding hills, of the coral reefs, of the seaweed and of the water, which has been affected by the presence of myriads of animal organisms. Edom, the name of a country adjoining the Gulf of Akabah, is the Hebrew word for *red,* and may have suggested the name.

RED'START, the most graceful of American warblers. It is known to the inhabitants of Cuba, from its quick, darting movements among the dark forests, as "Candelita," *the little torch.* It is a summer resident over the

greater part of North America, from Canada to Mexico, and in the winter months is found in Cuba, the West Indies and Northern South America. The adult male is a shining black, with vivid, salmon-red markings. In the plumage of the female and young the black is replaced with brown, and the salmon becomes a dull yellow. The redstarts spread their tails like fans when in flight. They nest in trees, and their eggs, four or five in number, are a grayish or bluish-white, spotted and blotched with lilac and dark brown. They feed chiefly on insects. The European redstart is a small song bird related to the nightingale.

THE REDSTART

RED WING, Minn., the county seat of Goodhue County, and a manufacturing city of importance in the southeastern section of the state. It is located on the Mississippi River, here spanned by a high bridge, forty miles southeast of Saint Paul, and is served by the Chicago, Milwaukee & St. Paul and the Chicago Great Western railways. The place was settled in 1845, was incorporated in 1858 and was named in honor of Red Wing, the Indian chief. Scandinavians and Germans are largely represented in the population, which increased from 9,048 in 1910 to 10,004 (Federal estimate) in 1916. The area of the city comprises seven square miles.

Red Wing is an important wheat market, but is better known as a manufacturing center, its thirty industrial plants having an annual output valued at $7,500,000. The largest of these make clay products, pottery and sewer pipe; besides, there are milling, malting and brewing plants, linseed mills producing oil and oil meal, furniture factories, launch and engine works, and a variety of other employments. The city has Red Wing Seminary, the Lutheran Seminary for women, the state training school for delinquent children and a public library. The Auditorium, Federal building, Masonic Hall, city hall, county courthouse and jail are prominent buildings. J.F.M.

RED'WOOD, a giant, cone-bearing tree of Western United States, belonging to the *Sequoia* genus. The tree is described in these volumes in the article Sequoia, subhead *Redwood*.

REED, Thomas Brackett (1839-1902), an American congressman who earned the nickname of "Czar" Reed by introducing into the House of Representatives a code of rules which put an end to filibustering and made it possible for the majority to transact business in the face of opposition. Under the new ruling a quorum was obtained by authorizing the Speaker to count as present members who refused to vote but remained in their seats. The "tyranny of Czar Reed" was the leading subject discussed in politics for some time, and overshadowed many other questions of public interest; the United States Supreme Court sustained the innovation.

THOMAS B. REED

Reed was born in Portland, Me. He was graduated at Bowdoin College in 1860, studied law and practiced in Portland. He served for a year as paymaster in the navy during the War of Secession, and after the war was elected to both branches of the Maine legislature. From 1870 to 1872 he was attorney-general of the state of Maine. Elected to the national House of Representatives in 1877, he continued there until the close of 1899, when he refused another reëlection. From 1889 to 1891, and again from 1895 to 1899, he was Speaker. In 1892 and 1896 he was an unsuccessful candidate for the Republican nomination for President. Reed's methods in the House were adopted by his successors, but a reaction in 1910 deprived the Speaker of much of his power (see Cannon, Joseph Gurney). A book on parliamentary law, called *Reed's Rules,* was written by him.

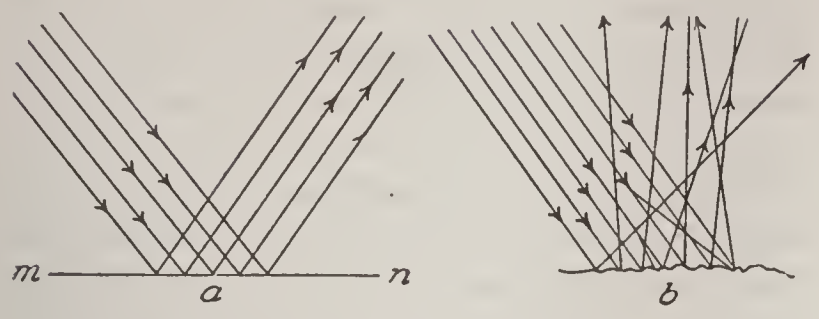
Consult Fuller's *Speakers of the House;* McCall's *Life of Thomas B. Reed.*

REEDBIRD, the name given to the bobolink when it reaches the Carolina rice fields in late summer on its southern migration. See Bobolink.

REFERENDUM, *ref er en' dum,* a progressive political principle, discussed in these volumes under the title Initiative and Referendum.

REFLECTION, *re flek' shun.* A ball thrown against a wall will bound back into the space

through which it came. If it strikes the surface at an acute angle it will rebound at an



REFLECTION OF LIGHT

(*a*) Regular reflection of rays from the plane surface *m n*; (*b*) diffused reflection from an uneven surface.

acute angle with that surface, and the two angles will be equal. These statements illustrate concretely what happens when a ray of light, heat or sound (a wave of radiant energy) strikes upon a surface; it is turned back, or *reflected*. The angle at which a wave of radiant energy strikes a surface is called the *angle of incidence*, and the angle at which it is turned back is the *angle of reflection*. As stated above, these angles are equal. The reflection of light is discussed fully in these volumes under a subhead in the article LIGHT. See also SOUND; ECHO.

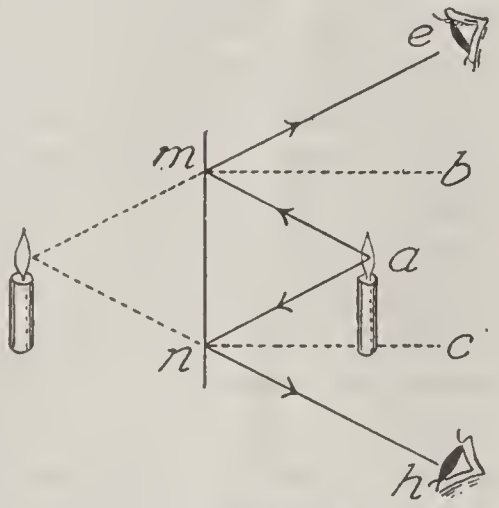
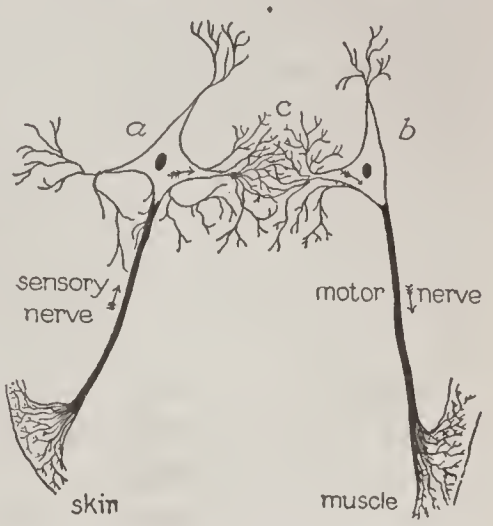


IMAGE FORMED BY A MIRROR

The mirror is represented by *m n*. An observer at *e* whose gaze rests upon the mirror at *m* will see there the reflected light from the candle *a*. The line *m b* bisects the angle *e m a*, and helps to visualize the fact that the angle of incidence is equal to the angle of reflection. The same effect is produced if the observer is below the mirror, at *h*.

REFLEX, *re'fleks,* ACTION. If you place your hand on a hot stove it is withdrawn even before you have time to think. A sudden and unexpected sound may cause you to jump and possibly to scream. Did you intend to jump? "No," you reply, "I did it before I knew it." These and similar acts are good examples of reflex action, which is action caused by the communication of a sensory with a motor nerve through a nerve center. The term is generally restricted to involuntary acts like those mentioned above and to acts of which we are unconscious.

The simplest form of reflex action is shown in the accompanying diagram, which illustrates what physiologists term the *reflex arc*. The surface of the skin is touched, and the impulse traverses the sensory nerve to *a*, the sensory nerve cell. At *c* the fibers of this cell interlace with those of the motor nerve cell *b*, and the impulse is carried along the motor nerve to the muscle, which it causes to contract. A study of the diagram shows that the following mechanism is necessary to produce a reflex act: a sensitive surface, usually the skin; a sensory nerve; a motor nerve connecting with a muscle, gland or blood vessel; and a nerve center in which these nerves connect. This is the simplest form of reflex arc, and we have described the simplest reflex act. There are, however, some reflex acts that are very complex. Some of them control the action of glands and others affect the circulation and respiration.



REFLEX ACTION ILLUSTRATED

Reflex acts of the spinal and cranial nerves are performed more quickly than voluntary acts, and they often protect the body from injury. Before you were aware that your hand was on a hot stove it had been jerked away, or the sensory impulse may have divided at the reflex center and part of it gone on to the brain; in that case you felt the pain so near the instant you moved your hand that the sensation and the movement seemed to come together. The time for a reflex act of this sort is from six-hundredths to eight-hundredths of a second.

The chief reflex centers for involuntary reflex action are in the medulla oblongata and the spinal cord, but smaller centers are located in different parts of the body. As we have seen, some of the sensory impulses may be carried to the brain; therefore not all reflex acts are unconscious. Many voluntary reflexes become automatic by long practice, and many acts that are begun voluntarily, such as walking, are continued without further attention. All reflex action is for the protection of the body or for conserving the various higher activities of the brain.

W.F.R.

Related Subjects. The following articles in these volumes should be read in this connection:

Brain, subhead
Medulla Oblongata
Habit
Nervous System

REFORMATION, *ref or ma' shun,* THE, a religious and political revolution of the sixteenth century which resulted in the founding of the Protestant churches of the world. The leader of this great movement was Martin Luther, a German monk and scholar, impetuous, deeply religious, and utterly without personal ambition. It is no longer possible to regard the Reformation solely as a religious movement, a sudden break with the Catholic Church, due to the leadership of one man. Without in the least underestimating the immense importance and influence of such a leader, scientific study and researches of both Catholic and Protestant scholars have clearly revealed the economic and political forces at work at the time. Luther's part was to fan into flame the smoldering thought of generations.

The direct result of the Reformation was the founding of Protestant churches in Germany and parts of Switzerland, in England and Scotland and the Scandinavian countries, and forsaking the established faith of centuries. In every case reformers attempted to justify the changes they instituted by appealing to the Bible as their authority. The founding of the new Church, the division of the believers in Christianity into two great factions, Protestants and Catholics, later resulted in religious wars, both foreign and civil, which kept Western Europe turbulent for nearly one hundred and fifty years, from the Diet of Augsburg in 1530, at which the Protestant German princes submitted the "Augsburg Confession" (their confession of faith which resulted in the Schmalkaldic Wars), until the English Revolution and the League of Augsburg in 1688.

The power of the Church of Rome at the time of the Reformation was very great. For a thousand years it had been uniting politically with the governments of Europe, had been building itself into the life of the people, with the Pope, called the Bishop of Rome, in supreme authority over every temporal ruler. Its wealth was enormous, its intellectual and social influence a powerful force. No one questioned its divine authority. It was, in short, a strongly-organized international institution, infinitely more stable than any of the existing governments. The kingdoms of Western Europe were at that time very unstable, with their shifting boundaries, their incessant wars and their deep-rooted class antagonisms. Spain, France, England and Germany were all trying to build up strong, centralized governments, and were succeeding gradually.

Feudalism was dying out. The relations between the rulers and their princes, and between the princes and their vassals, had weakened. No real control was exerted by the king of any country over the heads of the separate provinces under him. Each prince or overlord was the real ruler of his state; but for purposes of defense against foreign invasion and aggression, and in self-defense against the peasant classes, who were in all countries bitterly hostile to the aristocracy, king and nobles tended constantly to unite.

The condition of the poor was very pitiable. Foreign wars had reduced them to bitter want. They were the victims of every abuse; plundered by the higher classes of society. Then came the revival of learning, which brought into being another distinct class, the scholars. Up to the period called the *Renaissance,* knowledge and books had been the exclusive privileges of the aristocracy. But after that time they became the heritage of increasingly large numbers of men. Universities and schools sprang up everywhere, and the towns were thronged with students. It was from the ranks of these students that the leaders of the common people were drawn—Wycliffe in England, Huss in Bohemia, Erasmus (who preceded Luther) in Holland, and Zwingli and Calvin in Switzerland—men who stirred and inspired the people with their religious teachings. In them the people found champions who had no personal ambition and no material gain in view. In addition, the scholars of all countries tended to gather in the different university towns, and there to interchange ideas and to carry the culture and beliefs of others back to their own countries. The Reformation owed much of its success to the rapidity with which Luther's ideas and teachings were thus spread abroad.

Erasmus had noted the abuses of power and privilege which had arisen in the Church, and had by his writings attempted some reform. Luther, when he nailed his protest on the church door in Wittenberg, in 1517, was attempting to do the same thing. He was protesting against specific evils, for which he certainly did not hold the Catholic creed responsible. His act was, in addition, a challenge to a debate; it was one of the established customs among the students and scholars of university towns. Probably no one was more surprised than he when his articles, which had been written in Latin, were translated into German and were printed and circulated throughout Germany. Later, when the atten-

tion of all Western Europe had centered on the quarrel between the Pope and a German monk, and Luther had to choose between retracting what he had said or becoming an avowed rebel, he chose the latter course. When Leo X issued a bull excommunicating him, he publicly burned it in the market place.

The situation in Germany at this time, about 1520, was very favorable to Luther's cause. The nobles and rulers in general resented the Pope's claim to the right to interfere in the internal affairs of their country. The Pope also claimed the right to fill all vacancies which occurred in the Church; the rulers naturally desired to fill these vacancies with their own friends and supporters. And, what was perhaps most unsatisfactory of all, a ruler, confronted with an empty treasury and the necessity of a foreign war, had before him the spectacle of the enormous wealth of the Church, exempt from taxation.

Charles V had just been elected ruler of the German provinces on the death of his grandfather, Maximilian. But Charles was more Spanish than German, and was king, as well, of Spain and Sicily, Naples and Sardinia, Lord of the Netherlands and Burgundy and of the Austrian Grand Duchies. Ambitious for further conquests, Charles could ill afford to offend the Pope. So, realizing nothing of the situation in Germany and the strength of Luther's following, he was persuaded to issue a decree against Luther at the Diet of Worms, and then left Germany to be gone for the next ten years, engaged in wars with France.

The German princes felt no particular loyalty for Charles, and they did feel a great antagonism towards the demands of the Pope. Some of them were men of courage and high ideals, who understood and sympathized with Luther's position and his newly-published creed, and he found strong supporters among them who refused to suppress his writings or to enforce the king's edict. The only effect, practically, of Charles' decree was to make it necessary for Luther to exile himself for a while in the castle of the Elector of Saxony, where he spent a part of his time translating the Bible anew into the German language.

Luther proved himself an able leader of the tremendous forces he had released, and this, added to his deep religious enthusiasm, had much to do with the ultimate success of the movement. The Reformation did not take root, however, without bloodshed. Wars resulted from the controversy, the Peasants' War of 1525, and the Schmalkaldic War, the latter between the king and the ruling princes. The concession which the Lutheran princes finally won, together with the name *Protestant,* was that each ruler should have the right to decide what was to be the religion of his people, and that the followers of another religion were not to be persecuted. This decision did not, however, settle the matter, but led eventually to the Thirty Years' War.

Switzerland. An entirely independent movement was going on in Switzerland at the time of the Reformation in Germany, under the leadership of Ulric Zwingli, an even greater radical than Luther. In the civil wars which followed the attempts to suppress his teachings and his followers, Zwingli was killed, but the separate provinces in Switzerland won the same concessions as had the German provinces—the right of each separate state to choose its own religion. In Geneva, John Calvin, a new leader, had appeared; he was a young Frenchman who had been exiled for his religious beliefs. Under his leadership Geneva became the theological center of the new faith. The city was thronged with refugees and exiles, who studied under him and carried his teachings away with them into other countries. His own confession of faith differed radically from that of the Lutherans and resulted in the founding of the powerful Calvinist branch of the Church.

France. In France (and in Spain, as well) the state Church and the government had managed to achieve a good degree of independence of Rome before the Reformation period. The central government, having forced all the concessions it desired from the Pope, had nothing to gain by furthering or supporting Protestantism. In spite of persecutions, however, and the banishment of leaders like Calvin, nearly every province in France had many converts, who eventually formed a distinct political party known as the *Huguenots.* For thirty years France was torn by religious wars, with occasional intervals of peace. One of the tragic occurrences was the massacre of Saint Bartholomew's Day, in 1572, when thousands of Huguenots were put to death. In the end the Reformation failed. By the Edict of Nantes in 1598 the Huguenots were tolerated, but France remained a Catholic country until 1906, when the connection between the Church and State was dissolved.

Scandinavia. In 1523 Sweden broke away from the union with Denmark and Norway. The king and the new government were des-

perately in need of money, and the only immediate way to obtain it was to confiscate the properties of the Church. In order to do this with some show of justification, the king adopted Protestantism. He won the support of his nobles by proposing to restore to them all of the property and land which had passed into the hands of the Church since 1454. The Augsburg Confession was adopted, and services in the Swedish language were substituted for those in Latin. In Denmark the pupils of Luther who came into the country were encouraged by an ambitious king, Christian II, and the movement was also furthered by his successor, Frederick I. On Frederick's death, in 1533, when the question of succession again arose, the Protestants supported one heir, the clergy and Catholic nobles another, and civil war resulted. The Protestant prince, Christian III, was seated on the throne, and the new Church was permanently established as the state Church, both of Denmark and of Norway.

The Netherlands. It was natural that a country so close to Germany as was the Netherlands should adopt the new faith, and equally natural that a people so bitterly oppressed by foreign powers should stand together for political and religious freedom; but neither was won without torture and hate and persecutions, and weary years of war. The best generals that Spain could furnish were sent into that little country to put down the rebellion, and they failed. The nobles fought side by side with the common people, and, when they could fight no longer, they cut the dikes and let in the sea on the enemy. In the end the northern half of the country, Holland, under the leadership of William of Orange, won complete independence of Spain and of Rome. But Belgium, the southern half, remained Catholic.

England. The Reformation in England was unique, because it began simply with a change in the constitution of the Church. The English king, Henry VIII, wished to divorce his wife, Catharine of Aragon, and marry again. The Pope refused to sanction this cruel wrong (see CATHARINE OF ARAGON). The king forced Protestantism upon England through certain measures which established a new official Church, one entirely separate from the Church of Rome, and one whose laws permitted divorce. But real Protestantism did not gain much ground in England until the death of Henry VIII.

During Edward III's reign Protestantism was encouraged by his nobles and advisors, who were greedy for the wealth of the Church. Under Queen Mary, a Catholic sovereign, a violent reaction followed. The Protestants were terribly persecuted, and many of their leaders were burned to death. Everything was undone that had been gained for Protestantism during the two reigns preceding. Elizabeth, Mary's successor, repudiated the Church of Rome; at the same time she had no fondness for Protestantism, and the followers of both faiths suffered under her tyranny. The religious differences arising between the two parties were a source of controversy and hatred for more than one hundred years, and no satisfactory settlement was reached until 1689, when a Toleration Act granted a limited amount of religious freedom. The Anglican Church, the one founded by King Henry, remained the state Church of England, and is known as the Church of England.

Scotland. Scotland had a great leader named John Knox, a friend and pupil of John Calvin, who held much the position there that Luther held in Germany. Although the adherents of the new religion were cruelly persecuted and many of their leaders died at the stake, Knox succeeded in establishing a Calvinist Church. Mary Stuart, during her short reign, tried to reëstablish the old faith, but Knox's leadership was strong, and Protestantism prevailed.

Ireland. Without much resistance, Ireland adopted the new Church established by Henry VIII. Queen Mary promptly forced the Irish to repudiate it upon her accession to the throne, and Elizabeth as promptly forced them to accept it again. But the great mass of the people were entirely unaffected by these changes. In spite of them, Ireland continued then, and is to-day, a Catholic country, except that the northern counties are strongly Protestant.

Results of the Reformation. In Spain and Italy all rebellion against the Catholic religion was promptly and effectively checked. So, roughly, Protestantism was adopted by the countries of Northwestern Europe, while Catholicism remained the faith of the peoples of the South, even the southern parts of Germany continuing loyal to the Church of Rome. Catholicism had then and has to-day more adherents than has Protestantism. This condition was due in part to a Counter-Reformation within the Church itself, which was one of the important results of the great protesting religious movement. Through the Counter-Reformation the Church of Rome grew in vigor and influence. Abuses were swept away by reforming Popes and high officials, and every-

where, in order to retain its religious influence, the Church relinquished all claims to political power. A.C.

Consult Fisher's *History of the Reformation;* Foxe's *Acts and Monuments of the Church.*

Related Subjects. In connection with this discussion of the Reformation, the reader may find the following articles in these volumes of interest:

Augsburg Confession	Nantes, Edict of
Bull	Peasant War
Calvin, John	Pope
Charles V (Holy Roman Emperor)	Protestants
	Renaissance
Counter-Reformation	Roman Catholic Church
Eck, Johann M. von	Saint Bartholomew's Day, Massacre of
Erasmus, Desiderius	
Huguenots	Schmalkaldic League
Huss, John	Tetzel, Johann
Indulgence	Thirty Years' War
Luther, Martin	Wycliffe, John
Melanchthon, Philipp	Zwingli, Ulric

The subtitle *History* in the articles on the various countries mentioned may also be consulted.

REFORM SCHOOLS, state institutions for the education of boys and girls who need corrective influences. Reformatory education is usually resorted to after the efforts of home, public school and juvenile court have proven inadequate to restrain the tendency to crime. Separate institutions are maintained for boys and girls, but the aims of the two are similar, being the development of character rather than the infliction of punishment. A medical officer determines which children must be permanently restrained, because of feeble-mindedness or other physical reason for crime, and brings the health of all to the best possible grade. A parole system allows normal children to be placed in homes or employed outside the institution whenever practicable. All are taught occupations and trades with the idea of future self-support.

According to modern ideas, reformatories, whenever possible, should be placed in the country, where the young people may have the benefit of wholesome out-of-door work. The cottage plan, in which the children are divided into small groups and closely associated with their instructor, is growing in favor, and it is considered best that an institution be not too large for a single superintendent to know and understand every child under his supervision.

REFORMED CHURCH, the term applied in a general sense to all those Churches which came into existence at the time of the Reformation. It is also used to designate those Protestant Churches in which the Calvinistic creed prevails in opposition to the Lutheran doctrine. In Europe the Reformed Churches are usually called Calvinistic, and in some countries the term Protestant Church is equivalent to Lutheran Church. The Reformed Churches (generally considered) are those of England, Scotland, Holland and the Netherlands, many German Churches, the Protestant Church of France (see HUGUENOTS), the Protestant Church of Poland and many in America which have sprung from those in Europe.

In America there are four Protestant denominations which use the name Reformed Church. These are the Dutch Reformed, German Reformed, Christian Reformed and Hungarian Reformed. They have together about 464,000 communicants. Theodore Roosevelt was a member of the Dutch Reformed Church.

REFRACTION, *re frak' shun,* **OF LIGHT.** See LIGHT, subhead *Refraction of Light.*

REFRIGERATION, *re frij er a' shun.* See COLD STORAGE.

REGELATION, *re je la' shun.* Blocks of melting ice when pressed upon each other will freeze together, even when the temperature is above the freezing point. The term *regelation* is applied to this refreezing. No satisfactory explanation for this action of ice has been found. Some scientists claim that since water expands when it freezes, pressure will lower the freezing point and that as soon as the pressure is removed the water will freeze. This theory is considered of some importance in accounting for the formation of glaciers. See GLACIER.

REGENT, *re' jent,* from a Latin word, *regere,* meaning *to rule,* refers to *one who rules or governs.* However, the name is usually given to one who assumes the administration of state affairs when the rightful sovereign is under age, absent, or unable to fill the office in person. In hereditary kingdoms this office is generally held by the nearest relative of the king or queen who is capable of exercising authority.

In English universities the title of regent is given to doctors and masters who are also instructors. In certain parts of the United States and Canada the term is given to members of the governing bodies of state colleges and universities.

REGIMENT, *rej' i ment,* a body of soldiers forming an administrative unit of an army and generally commanded by a colonel. The term when first used, about the end of the sixteenth century, did not refer to a definite number of men, but to any body of troops commanded by

one man. To-day the size of a regiment varies in the armies of different countries.

In the United States army a cavalry regiment consists of twelve troops organized into three squadrons of four troops, each troop consisting of about sixty-eight officers and men. A captain commands such troops and squadrons are commanded by a major; the regiment, with total strength of 1,280, is commanded by a colonel and lieutenant-colonel.

Each regiment of infantry is divided into twelve companies, organized into three battalions of four companies each, with a maximum of 3,755 men. A British regiment may have two, three, or more battalions, each battalion with full strength of 3,000 men, divided into eight companies. Continental armies have regiments of 1,000 or 1,100 men approximately, divided into four or six companies. See ARMY, page 380.

REGINA, *re ji'na,* SASKATCHEWAN, the capital of the province and one of the chief railway and commercial centers of Western Canada, is situated on the Canadian Pacific, the Canadian Northern and the Grand Trunk Pacific railways, and on Wascana Lake, 357 miles by rail west of Winnipeg and about 100 miles north of the United States boundary. The streets are broad and well paved and the city plan provides for residential and industrial areas and for parks and playgrounds.

Manufacturing and Wholesale District. Regina possesses a unique feature seldom found in large cities. When the city was laid out a portion of the northern part of the site was set aside for manufactories and warehouses. The city has built and owns railway tracks in this area, by means of which every factory and warehouse can have freight cars brought to its doors. This convenience has attracted a number of large industrial firms to the city. In this area are found grain elevators, flour mills, foundries and machine shops, steel-wire works, stockyards, agricultural implement warehouses and many other establishments. Regina is one of the most important distributing centers in Canada and has the largest trade in agricultural implements of any city in the Dominion.

Public Buildings. The Parliament building is by far the most imposing structure in the city. It occupies a beautiful site of about 160 acres south of Wascana Lake. The building is of Tyndall stone, is 543 feet long and 227 feet wide and has a central dome 187 feet high. No more dignified structure or one better adapted to legislative purposes can be found in the Dominion. The municipal building is a beautiful and commodious structure and an ornament to the city. Other buildings worthy of note are the public library, the union passenger station, the normal school, the Collegiate Institute and the buildings of the Anglican and Regina colleges.

Parks and Playgrounds. Regina has over 250 acres of parks and a number of playgrounds which contribute to the beauty of the city and the pleasure of its inhabitants. Wascana Park, with a frontage of about a quarter of a mile on the lake, is the location of a large boat club. The lake affords opportunity for bathing and boating in summer and for skating and hockey in winter. Victoria Park is attractively laid out in walks, lawns and flower beds. Dominion Park is used chiefly for athletics, and Alexandra Park is fitted up for a children's playground. Stanley Park forms an appropriate frontage for the Union depot.

Schools and Colleges. The public schools are modern and of a high order of excellence. The Provincial Normal School is devoted to the training of teachers for the public schools. The Anglican College, Regina College, the Collegiate Institute and Anglican Ladies' College are all located within the city and combine to make Regina the educational center of the province.

Other Features. Regina is a city of beautiful homes and substantial business blocks, and has an extensive retail and wholesale trade. It is the headquarters of the Royal Northwest Mounted Police. It has large exposition grounds where exhibitions are held annually, and a winter Fair Building in which winter exhibitions and sports are held. The public utilities are owned and operated by the municipality.

History. The first settlement on the site of the city was made in May, 1882, and the town site was arranged jointly by the Canadian Pacific Railway Company and the Dominion government. The name *Regina* was conferred upon the town site by Lord Lorne when he was Governor-General of Canada. Regina was incorporated as a city in 1903. Population, census of 1921, 34,432.

E.H.O.

REGISTRATION (OF BIRTHS, DEATHS AND MARRIAGES). Nearly all countries require the proper authorities to register all births, deaths and marriages. Physicians are required to send to the proper recording officer of the county records of births and deaths, and clergymen

performing marriage ceremonies are required to send records of the marriages. Marriage licenses are also recorded when issued. The objects sought by registration are twofold. It provides a record frequently necessary in courts of law, and acts as a wholesome check upon immorality.

Registration (OF VOTERS). See ELECTION, subhead *Registration.*

REGULUS, *reg'u lus,* MARCUS ATILIUS, a famous Roman general of the third century B.C. In 267 and again in 256 he was elected consul, and during his second term commanded, with his colleague, the fleet sent against the Carthaginians in the First Punic War. Completely victorious on the sea, he landed with his forces and for a time was so successful that the Carthaginians sued for peace. Regulus demanded unconditional surrender, however, and they resumed the conflict, defeating the Romans in 255 B.C. with great slaughter and taking Regulus prisoner.

Beyond this point the story of his life must be looked upon as largely legendary. According to the popular account he remained in captivity until 250, when he was sent to Rome on parole to make negotiations for peace, promising to return if the terms offered were not accepted by the Romans. Realizing his danger, he yet urged the Roman Senate to continue the war at all costs, and then returned to Carthage to meet his fate, which proved to be death by torture. In revenge for this, Carthaginian prisoners were tortured at Rome; and later-day scholars are somewhat inclined to believe that Roman historians invented the tale about Regulus as an excuse for the barbarities which were perpetrated on these Carthaginian prisoners.

REHAN, *re'an,* ADA (1860-1916), an American actress of highest rank for over twenty years. She is said to have played 200 different parts, some of the most famous being those of Lady Teazle in *The School for Scandal,* Rosalind in *As You Like It,* and Katharina in *The Taming of the Shrew.* She was born in Ireland, but came to America at the age of six. Her first appearance on the stage was in association with her sister and brother-in-law, Mr. and Mrs. Oliver Doud Byron, and under her original name, ADA CREHAN. This became modified, at first through the mistake of a printer and then by her own choice, to Ada Rehan. Miss Rehan excelled in comedy rôles, and her personal magnetism, abounding vitality and charm made her a great favorite.

REICHSTADT, *ryKe'shtaht,* NAPOLEON FRANÇOIS CHARLES JOSEPH BONAPARTE, Duke of (1811-1832), called also Napoleon II, was the only son of Napoleon. At his baptism he was given the title of king of Rome, which had been borne by the heirs to the Holy Roman Empire. During the hundred days between Napoleon's escape from Elba and the Battle of Waterloo, Maria Louisa with her young son was at the court of her father, Francis I of Austria, and there the boy remained after the final abdication of his father, while his mother went to Parma. Napoleon had named his son as his successor, but the boy was never recognized by any of the European powers. He was given an excellent education, and showed a decided fondness for military affairs, but was never strong, and died when he was twenty-one years old. Edmond Rostand's drama, *L'Aiglon,* is based on the life of the Duke of Reichstadt; the title rôle was acted by Maud Adams and by Sarah Bernhardt.

REICHSTAG, *ryKes'tahK,* literally the *assembly of the Empire,* is the lower house of the German Parliament. Its members are elected by popular vote, and possess the sole legislative initiative, as the members of the upper house, the Bundesrat, must vote in accordance with the instructions received from the states which they represent. For detailed description of the German legislative department, see GERMANY, subtitle *Government;* BUNDESRAT.

REID, *reed,* GEORGE AGNEW (1860-), a Canadian painter, equally distinguished for landscape, figures and realistic subjects. He has also painted large panels for mural decorations, notably the series called *The Pioneers,* which he presented to the city of Toronto for the decoration of the city hall. His more important paintings, including *Mortgaging the Homestead, Dreaming* and *Champlain's Arrival at Quebec* are preserved in the National Gallery at Ottawa. Reid was born at Wingham, Ont. He studied painting at Toronto, Philadelphia, Paris and Madrid. He was president of the Ontario Society of Artists from 1897 to 1901, and president of the Royal Canadian Academy from 1906 to 1909.

REID, JOHN DOWSLEY (1859-), a Canadian physician and legislator, since 1911 Dominion Minister of Customs. Dr. Reid was born at Prescott, Ont., and was graduated at Queen's University, Kingston. He practiced medicine for a number of years, but in 1891 entered political life as a Conservative mem-

ber of the House of Commons. Thereafter he served without interruption, rising steadily in influence, until his appointment as Minister of Customs in 1911.

REID, [THOMAS] MAYNE (1818-1883), a British writer of stories of adventure. He was born at Ballyroney, County Down, Ireland, and was prepared for the Presbyterian ministry, in which his father was serving. The boy's craving for novel experiences, however, caused him to leave home for the United States, where he traveled extensively and as hunter and trader became acquainted with Indian life. In 1846 he took part in the Mexican War. In his travels and adventures he acquired a store of exciting incidents which, after his return to Europe, he used in writing his popular stories. He made a second visit to America and attempted unsuccessfully to establish in New York the *Onward Magazine.* His novels include *The Rifle Rangers, Scalp Hunters, The Boy Tar, The War Trail, White Chief* and *The Castaways,* all of which have been extremely popular with boys.

REID, WHITELAW (1837-1912), a man who held a high position in American journalism and the most honored post in American diplomatic service. Born in Xenia, Ohio, the son of poor parents, he was graduated from Miami University at the age of nineteen and for a time taught school. His journalistic career began with the purchase of the Xenia *News,* which he edited for three years. When the War of Secession began Reid acted as war correspondent for the Cincinnati *Gazette,* and was later sent to Washington as correspondent for the same paper. In 1868 he took the position of chief editorial writer for the New York *Tribune,* and in 1872 acquired control of the paper, of which he was part owner when he died. With the erection of the Tribune Building in 1873, he began the tall-building movement in New York.

From 1889 to 1892, under President Harrison, Reid served as United States minister to France, and at the expiration of his term was the unsuccessful Republican nominee for Vice-President of the United States. He went as special United States ambassador to Queen Victoria's Diamond Jubilee and to the coronation of Edward VII, and was a member of the Peace Commission at Paris in 1898. In 1905 President Roosevelt appointed him United States ambassador to England, a position which he held until his death. England honored him with a state funeral in Westminster Abbey, and his body was conveyed to America in a British warship. Reid received honorary degrees from leading American and English colleges. Notable among his numerous publications is his *Ohio in the War,* an exceedingly valuable state history of the War of Secession.

REIGN, *rane,* **OF TERROR,** a period of about fifteen months during the French Revolution. It is discussed under the heading FRENCH REVOLUTION.

REINDEER, *rane'deer,* one of the most valuable animals to man in the Arctic regions. In ages past reindeer ranged over Europe and Asia, but to-day they are found only in the extreme northern parts of those two continents. The animal has a thick body, short legs and broad feet that carry it easily over the snow. The antlers, which are common to both sexes, are large and branched and are slightly flattened at the ends. The wild reindeer lives on moss and seaweed, migrating inland during the short summer season to browse on such scanty vegetation as it can find, and ranging back towards the seashore again in winter.

If it were not for the reindeer the people of Lapland would have no means of transportation in their cold and barren country. In these animals they have steeds that can draw their sledges over the snow at the rate of twelve to fifteen miles an hour. They also have endurance as well as swiftness, for they can travel with a load of from 250 to 300 pounds for hours at a time. To the lowland Laplanders the reindeer is their horse, sheep and cow, all in one. These animals furnish the people with clothing and food, and if they live in tents, with shelter. In the summer reindeer meat is cured, and great quantities of cheese are made from the surplus milk and stored for use through the long winter.

The reindeer is coming to be of as much importance to the Eskimos of Alaska as it is to the Laplanders. When the white settlers went into Alaska and killed large numbers of the wild animals, particularly the moose and caribou, the Eskimos were threatened with starvation. The United States government, however, working through the Bureau of Education, began importing reindeer from Siberia in 1892. The government brought in Lapps, too, to show the Indians how to care for the animals. In 1916 the original 1,200 reindeer which had been imported from time to time had increased to 64,000 head, valued at about $1,600,000. Domestic reindeer increase in numbers much more rapidly than wild deer because

they are protected by man from their greatest enemies, the wolves. During the winter, when wolves are particularly ravenous, the Eskimos guard their herds from attack day and night.

An illustration of the reindeer appears in these volumes on page 1739, in connection with the article DEER. See, also, CARIBOU; LAPLAND.

RELIEF, *re leef',* a form of sculpture in which the figures stand out from a surface or background. It is to be distinguished from sculpture in the round, in which the objects are not attached to a background, but stand alone. The famous frieze from the Parthenon (see ELGIN MARBLES) is an example of relief sculpture. There are three important forms of this type of sculpture—low relief, high relief and semi-relief. These terms are explained under the headings ALTO-RILIEVO, BAS-RELIEF and MEZZO-RILIEVO. *Hollow relief* is applied to sculpture which has the figures carved below the surface. See SCULPTURE.

RELIGION, *re lij'un.* Should a person attempt to collect all that has been written on the subject of religion he would find himself acquiring a mammoth library. Religion is one of those subjects that admit of innumerable definitions and classifications, theories and speculations. The majority of students, however, agree that it has to do with belief in powers or beings that affect or control human life, and with practices connected with such belief.

A very general classification divides the world's religions into those which recognize one Supreme Being (*monotheistic*) and those which recognize several gods (*polytheistic*). A more satisfactory classification is that offered by Jastrow, who makes the following four divisions:

(*a*) The religions of savages;

(*b*) The religions of primitive culture, such as those of the Indians of Mexico and Peru and those of the Polynesians;

(*c*) The religions of advanced culture, which include those of Egypt, Babylonia and Assyria, China, Greece and Rome;

(*d*) The religions coextensive with life, such as Judaism, Buddhism, Mohammedanism and Christianity.

The religions of the first two groups are characterized by the worship of objects in nature, such as the sun, moon and mountains, and the worship of spirits, especially those of ancestors. Various magical rites and ceremonies accompany this worship. In the religions of advanced culture magic is replaced by my-

RELIGIOUS STATISTICS OF THE WORLD

Number in the World According to Creed

RELIGION	NO. OF FOLLOWERS	RELIGION	NO. OF FOLLOWERS
1 Christianity	564,510,000	6 Judaism	13,052,846
2 Confucianism and Taoism	300,830,000	7 Animism	158,270,000
3 Hinduism	210,540,000	8 Shintoism	25,000,000
4 Mohammedanism	221,825,000	Unclassified	15,280,000
5 Buddhism	138,031,000		

By Continental Distribution

RELIGION	EUROPE	ASIA	AFRICA	NORTH AMERICA	SOUTH AMERICA	OCEANIA
Christianity. (See table below.)						
Confucianism and Taoism	.....	300,000,000	30,000	100,000	.....	700,000
Hinduism	.....	210,000,000	300,000	100,000	110,000	30,000
Mohammedanism	3,800,000	142,000,000	51,000,000	15,000	10,000	25,000,000
Buddhism	.....	138,000,000	11,000	.....	.....	20,000
Judaism	9,950,175	484,359	404,836	2,144,061	50,000	19,415
Animism	.....	42,000,000	98,000,000	20,000	1,250,000	17,000,000
Shintoism	.....	25,000,000	.....	.....	.....	.....
Unclassified	1,000,000	6,000,000	130,000	8,000,000	.....	150,000
Total Non-Christians	14,750,175	863,484,359	149,875,836	10,379,061	1,420,000	42,919,415

Christianity

CATHOLIC CHURCHES	TOTAL FOLLOWERS	PROTESTANT CHURCHES	TOTAL FOLLOWERS
Roman Catholic	272,860,000	All Denominations	171,650,000
Eastern Churches	120,000,000	Total Christians	564,510,000

Christianity by Continental Distribution

RELIGION	EUROPE	ASIA	AFRICA	NORTH AMERICA	SOUTH AMERICA	OCEANIA
Catholic Churches:						
Roman Catholic	183,760,000	5,500,000	2,500,000	36,700,000	36,200,000	8,200,000
Eastern Churches	98,000,000	17,200,000	3,800,000	1,000,000	.....	.....
Protestant Churches	93,000,000	6,000,000	2,750,000	65,000,000	400,000	4,500,000
Total Christians	374,760,000	28,700,000	9,050,000	102,700,000	36,600,000	12,700,000

thology, and the priests begin to serve as guardians of the morals of the people; there is an approach to an ethical religion.

It is the religions coextensive with life that have the most vital effect in the life of the individual. That is, they demand of their followers the practical application of certain lofty ethical standards. They are more spiritual than the religions of the first three groups, and in their forms of worship superstition is of less importance. Considering them from a racial standpoint, it is interesting to note that the nations which have most influenced human history are those in which Christianity is the prevailing religion.

The term *religion* is derived from the Latin *religio*. There are two theories as to the derivation of the Latin term, some holding that it comes from a verb meaning *to gather together,* and others that it is derived from a verb meaning *to bind*. The latter think that their interpretation is correct because religion binds one to certain obligations. The historical and scientific study of religion, called *comparative religion,* dates from the nineteenth century.

Religions of the World. In the tables on the preceding page are given the numbers of followers of the great religions of the world:

Related Subjects. The articles in these volumes relating to religion are numerous. The reader is referred to the following:

Abbot
Absolution
Adventists
African Methodist Episcopal Church
Agnostic
Allah
Alpha and Omega
Altar
Amana
Amen
Anabaptists
Ancestor Worship
Angel
Anglican Church
Animal Worship
Antipope
Apostles
Archangel
Archbishop
Articles, The Thirty-nine
Atheism
Atonement
Ave Maria
Baptism
Baptists
Benedictines
Bishop
Brahma
Brahmanism
Breviary
Buddhism
Bull
Canon Law
Canonization
Capuchins
Cardinal
Carthusians
Cathedral
Censer
Chaplain
Charity, Sisters of
Christian Endeavor, Young People's Society of
Christianity
Christian Science
Christmas
Church
Church of England
Conclave
Concordat
Congregational Church
Counter-Reformation
Covenanters
Creed
Cross
Deaconess
Dervish
Devil
Devil Worship
Disciples of Christ
Dominicans
Druids
Dukhobors
Dunkers
Easter
Epiphany
Episcopal Church
Epworth League
Eucharist
Evangelical Alliance
Evangelical Association
Fasts
Fatalism
Fire Worship
Foreordination
Franciscans
Free Methodists
Freethinker
Gentiles
Ghebers
God
Greek Church
Hadj
Heaven
Hegira
Hell
Heresy
Hermits
Hierarchy
High Priest
Holy Water
Holy Week
Huguenots
Hussites
Idol
Immortality
Incense
Index Expurgatorius
Indulgence
Innocents, Feast of Holy
Islam
Jehovah
Jesuits
Jesus Christ
Jews
Koran
Lamaism
Latter Day Saints
Lent
Litany
Liturgy
Lutherans
Magi
Magnificat
Martyr
Mass
Mendicant Orders
Mennonites
Mercy, Sisters of
Messiah
Methodists
Missal
Missions and Missionaries
Mohammedanism
Monasticism
Monk
Moravian Brethren
Mormons
Mysticism
Natural Theology
Nature Worship
Nonconformists
Nun
Nunc Dimittis
Nuncio
Pantheism
Parsees
Paulists
Penance
Polytheism
Pope
Predestination
Presbyterians
Priest
Prophet
Protestant
Purgatory
Quakers
Rabbi
Reformed Church
Religious Liberty
Resurrection
Rogation Days
Roman Catholic Church
Rosary
Sacrament
Sacred College
Sacrifices
Salvation Army, The
Seventh Day Adventists
Shakers
Shamanism
Shinto
Sunday Schools
Supernaturalism
Swedenborgians
Synagogue
Talmud
Taoism
Theosophy
Trappists
Trinity
Unction
Unitarians
Universalists
Ursulines
Vatican Council
Vicar
Volunteers of America
Wesleyan Methodists
Zionist Movement

The lives of the following religious leaders will also be of interest in this connection. The clergymen and churchmen are listed under PROTESTANT and ROMAN CATHOLIC CHURCH.

Blavatsky, Helena P.
Booth
Calvin, John
Confucius
Dowie, John A.
Eck, Johann Maier von
Eddy, Mary Baker
Fox, George

Huss, John
Hutchinson, Anne
Knox, John
Loyola, Saint Ignatius of
Luther, Martin
Melanchthon, Philipp
Mohammed
Moody, Dwight Lyman
Smith, Joseph
Sunday, William A.
Swedenborg, Emanuel
Wesley, John
Williams, Roger
Young, Brigham
Zoroaster

RELIGIOUS, *re lij'us,* **LIBERTY,** the right of a person to adopt and profess opinions on religious subjects and to worship or refrain from worship, according to desire or to the dictates of conscience, without any external control. The idea of religious liberty was wholly lacking among the nations of antiquity, and the religion of the individual was always subject to the will of the king. The Roman Empire had its state religion, to which every subject was supposed to conform, but little official attention was paid to other beliefs as long as they did not interfere with the state religion or with the established institutions of government. Christianity, however, was put under the ban because of its teachings in regard to the brotherhood of man, the fatherhood of God and the kingship of Christ.

During the early centuries of the Christian era, there were only spasmodic attempts at persecutions, and not until the time of Diocletian was there a systematic effort to stamp out the Christian religion. By his order Christian assemblies were forbidden, churches were destroyed, books were burned, and all who refused to adopt the state religion were made to suffer. Under Galerius, toleration was granted to the Christians, with the proviso that the religion of the state was to be respected. Emperor Constantine was later converted to Christianity, and he issued an edict in 313 which granted full toleration of religious worship to all persons. This was soon followed by an order making Christianity the religion of the state and prohibiting heathen worship. During the Middle Ages the teachings of the Roman Catholic Church came to be so fully accepted in all countries that the question of religious liberty did not arise. Later, when dissenters appeared, they were opposed. When entire states revolted from the allegiance of the Pope, as England under Henry VIII, they always set up state churches, to which all subjects were compelled to conform.

The Reformation with its new thought did not in any way bring religious liberty, for each sovereign insisted upon unity of religious faith as necessary for the unity of the state. Sometimes when one sovereign succeeded another of a different faith, the religion of the state was changed to conform to that of the sovereign and all dissenters were persecuted. Henry VIII persecuted all who refused to recognize the state Church, whether they favored the Roman Catholic Church or whether they wanted to be even more Protestant than the state Church. Then, when Mary came to the throne, Catholicism was for a time reëstablished, and persecutions were carried on against all who refused to acknowledge the Roman faith. (See ROMAN CATHOLIC CHURCH; PROTESTANT.)

In the United States. The Pilgrims left England in order to find a place where they might worship as they chose, but even they carried with them the prevailing ideas of religious intolerance. In all of New England except Rhode Island dissent from the established order of Church worship and belief was looked upon as sedition against the state and sin against God. Baptists, Jesuits and Romish priests were imprisoned or banished, and several Quakers were publicly hanged on Boston Common. In the Catholic colony of Maryland, religious toleration existed for a time to all except Jews, Mohammedans and other non-Christians; the Church of England was established in Georgia just before the Revolution. Only in Pennsylvania, Delaware and Rhode Island were there no state churches.

The United States Constitution declares that "No religious test shall ever be required as a qualification to any office or public trust under the United States." There was considerable objection to the Constitution in some of the states because non-Christian sects were not excluded from holding office, and also because Congress was not empowered to establish a national Church. Nevertheless, the first amendment to the Constitution provided that "Congress shall make no law respecting the establishment of religion, or prohibit the free exercise thereof." The states, however, were allowed to establish state churches or to leave the matter alone, as they pleased.

The colonial government churches were continued in the states where they already existed, but the idea of complete religious liberty gradually developed. The entire separation of Church and State was secured in Pennsylvania and South Carolina by new Constitutions in 1790; in Vermont and New Hampshire by acts of the Legislature in 1807 and 1819; in Delaware and Connecticut by the adoption of new constitutions in 1818 and 1831; in Massachu-

setts by an act of the Legislature in 1833; and in Virginia by a decision of the court of appeals in 1840. Most of the State constitutions now guarantee religious liberty. Many also forbid compulsory attendance or support to any Church, and some forbid public appropriations for any religious organization. A curious inconsistency appears in the fact that eight states forbid anyone holding public office who denies the existence of a Supreme Being or of a future state of rewards and punishment.

While almost complete independence in religion now exists, this liberty, like any other, may be abused. Thus religious liberty cannot be extended to include acts which are considered inconsistent with the peace and safety of the state. On this ground the courts upheld the United States law prohibiting the practice of polygamy. Religious liberty has developed in America as it never existed before in any land, and its success in the United States has exerted a powerful influence over other countries.

In Other Countries. While England still has its established Church, yet all religious tests for holding office have been abolished, except in respect to the Crown; the sovereign must be an adherent of the Church of England. The same freedom exists in all English colonies. In France no religious denomination receives any aid from the state, while in Germany freedom is allowed, with only certain restrictions on the right of assembly. E.D.F.

REMBRANDT, *rem'brant* (1606-1669), the representative painter of the Golden Age of Dutch Art, and one of the greatest masters of portraiture who ever lived. In the treatment of light and shade Rembrandt has no equal, and he likewise has a preëminent position in the field of etching. He was born at Leyden, and his name in full was Rembrandt Harmensz van Rijn. At the age of twenty-two he established himself at Amsterdam, where he spent the rest of his life. There, in 1634, he married the beautiful Saskia van Uylenborch, of whom he painted numerous portraits. In the gallery at Dresden may be seen one of the finest of these, together with a beautiful canvas of both, entitled the *Wedding Breakfast.* The artist was exceedingly fond of painting his own likeness and likenesses of the members of his family. Saskia was the inspiration of many of his finest achievements, and after her death, in 1642, his good fortune waned. Though he had enjoyed a high reputation and been looked upon as the most popular portraitist of the day, he died in poverty and obscurity.

REMBRANDT

"Rembrandts" are to be found in numerous galleries of Europe and America. The artist's first great masterpiece, *The Anatomy Lecture,*

REMBRANDT STATUE AT AMSTERDAM

painted in 1632, is in The Hague; his most celebrated work, the so-called *Night Watch,* is in the Royal Museum at Amsterdam. This wonderful canvas, faithfully reproduced in color herewith, with its inimitable disposition of light and shadow, is really a day scene in which is shown a portion of the civic guard issuing from the clubhouse. Of almost equal fame is *The Syndics,* in the same museum. The Metropolitan Museum, in New York, has a likeness of his son Titus, the celebrated *Old Woman Cutting Her Nails, The Auctioneer* and several others; in the Art Institute, Chicago, is his admired *Girl at a Window.* There are also many noted "Rembrandts" in private collections in America. Probably his best-known landscape painting is *The Mill,* a treasure of the Widener collection in Philadelphia. Rembrandt also left many fine examples of re-

THE NIGHT WATCH

REMBRANDT has frequently been called the "Prince of Shadows," and the title indicates one phase of his genius—his mastery of light and shade. Just where the light comes from is not always apparent, but that seems a minor matter when the eye can delight itself with the marvelous glow of light against soft, luminous shadow. His color, too, is rich and true, and his modeling of the human figures beyond criticism; but these are not his chief merits. It is by reason of his humanity that he is really great—his ability to make the men on his canvas seem actually to live.

Many men in Rembrandt's time, and earlier, had been commissioned to paint portrait groups, and in every case the result had been a mere conventional grouping; but Rembrandt, engaged to paint the portraits of the musketeers of Amsterdam, made of his picture this "embodiment of that civic heroism which had lately brought about Dutch independence." It is a strange mingling of fact and poetry, realism and fancy, in true Rembrandt style; but it is *alive*. It was long called *The Night Watch*, and the title fitted well the dingy, smoke-blackened canvas which hung in the Amsterdam Town Hall. But in 1889 the picture was cleaned and brightened, and emerged not as a night watch but as a full daylight scene in the master's happiest style.

L. J. B.

ligious painting, notably the *Pilgrims at Emmaus* (Louvre). His etchings are represented by *Descent from the Cross, Christ Healing the Sick* and *Burgomaster Jan Six.* In all there are about 280 canvases and 320 etchings of the master extant, representing the years between 1625 and 1668.

REMÉNYI, *reh'mayn ye,* Édouard (1830-1898), a famous Hungarian violinist and writer. He received his musical education at the Conservatory of Vienna, but was compelled to leave Austria because of his prominence in the insurrection against Austrian rule. He won his greatest triumphs in America. To him music was a vital thing, not a mere accomplishment. As he wrote in one of his essays, "It is my life, my blood, my everything," and his playing revealed that these words were true. He visited almost every country of note in the world, but it was American life and scenery which inspired his finest essays, notably *Popular Music, American vs. European Civilization* and *Love of Natural Scenery.*

REM'INGTON, Frederic (1861-1909), an American painter, sculptor and writer, who successfully portrayed the life and atmosphere of the great West of pioneer days. He was born at Canton, N. Y., and received his art training in New York City. The inspiration for his work came after a trip to the Western country, where he herded with cowboys, shot antelope and buffalo and camped with the Indians. The beauty of the great Western plains, with their marvelous desert colors and atmosphere of mystery, made an indelible impression upon him, which his canvases reveal in a striking way.

He began his artistic career first as an illustrator of stories of Western life and later as a painter not only of Indians and cowboys but of the mines as well, each in their natural environment. Later he became interested in bronze work, and his two statuettes, *Bronco Buster* and *Wounded Bunkie,* were executed with the skill and feeling which characterized his paintings. Both of these are now in the Metropolitan Museum in New York. That institution also possesses one of his best paintings —*Cavalry Charge on the Southern Plains.* He wrote and illustrated *Pony Tracks, Crooked Trails* and *The Way of an Indian.*

REM'SEN, Ira (1846-), an American chemist and educator, for eleven years president of Johns Hopkins University. He was born in New York City and was educated in the College of the City of New York, the College of Physicians and Surgeons of the same city, and the universities of Göttingen and Munich. From 1872-1876 he was professor of chemistry and physics at Williams College, and on the founding of Johns Hopkins University he went to Baltimore to found the department of chemistry in the university. In 1901 he was made president of Johns Hopkins, from which position he resigned in 1912 to devote himself again to chemical research.

Dr. Remsen is editor of the *American Chemical Journal,* and has done much important investigation in the fields of organic and inorganic chemistry. His textbooks have been republished in England and translated into several languages. Among his works are *Theoretical Chemistry, Organic Chemistry, Introduction to Chemistry, Elements of Chemistry* and *The University Movement.*

RENAISSANCE, *ren eh sahNs',* a French word meaning *new birth,* applied to the revival or rebirth of interest in intellectual matters, marking a period of transition from medieval to modern methods of thought and study. It has become customary to attempt to fix a definite period to this Renaissance, some authorities stating that it was due to the influx of Greek manuscripts and scholars into Europe after the fall of Constantinople in 1453. Though the capture of the eastern seat of learning by the Turks must naturally have had the effect of driving westward much culture and learning, the Renaissance was really the result of a gradual process of education which had been extending over the west of Europe for a century previously.

The Middle Ages are disparagingly spoken of as days of dark barbarity and ignorance, but such was not entirely the case. Those days had a culture of their own, and the change of method of thought in art, literature and science was in a great measure due to the increasing number of students who went East to study after having had their intellectual curiosity awakened in the West. Medieval learning in Europe was almost entirely confined to the clergy, and had been chiefly devoted to solving and explaining religious mysteries. The influx of more advanced learning from the East broadened Western minds, opened up new channels and gave to study a more critical, analytical turn. Gradually the conventional narrow rules governing the study of the sciences were overthrown. An era of inquiry was ushered in. Men's minds were ready to receive new impressions, a new im-

petus was given, and a great desire for learning was created. This learning was sought in a freer, broader spirit, unrestricted by the narrow limits previously imposed by the clergy and conventionality.

To enumerate the effects of the Renaissance is to discuss the history of art, literature, science, philosophy, poetry, even religion. In every field of human activity there existed a new spirit. Men were no longer content to accept the answer of tradition to the question of "why." The intellectual life of the world had run in one groove for centuries; it was now to jump back to the many-grooved life of the ancient Greeks and Romans, and there find inspiration for new paths. One of the vital elements in the great movement was the perception of man's dignity as a reasoning, willing and knowing being. The new spirit may be said to have humanized knowledge.

In Italy, where the Renaissance first reached its bloom, the scholars were soon fascinated by study as an end; "art for art's sake" was really the unexpressed motto of the Italians. In the northern countries, Germany, the Netherlands, England and even in France the Renaissance developed more naturally. Where in Italy the New Learning gradually became affectation, in the north it became a thing of power. Particularly in Germany the Renaissance became the religious Reformation. In France and England, as in Germany, the revival of learning was intimately connected with the Reformation. In these countries there was instilled a new feeling for beauty and truth, and there was a period of glory for the arts and literature, but the Renaissance spirit gradually became what we would to-day call a practical one rather than a purely aesthetic one. F.ST.A.

Related Subjects. In connection with the subject of the Renaissance the reader is referred to the following articles in these volumes:

Boccaccio, Giovanni	More, Sir Thomas
Erasmus, Desiderius	Petrarch, Francesco
Medici	Reformation
Middle Ages	

RENAN, *reh nahN',* Ernest (1823-1892), a French philologist and historian, known to general readers chiefly for his *Life of Jesus.* He was born at Tréguier, in Brittany, and after the death of his father in 1828 was dependent for guidance and in part for support upon his sister Henriette, whose influence in his life cannot be overestimated. At the ecclesiastical school in Tréguier and later at Saint Sulpice in Paris he was trained for the priesthood, but he found himself unable to adopt the doctrines of the Catholic Church, and in 1845 took a position in a boys' school. A *General History of Semitic Languages* met with such favor that he was sent by the academy to study in Italy and later in Syria, where his interest in languages was confirmed.

In 1862, after his return from Syria, Renan was given the chair of Hebrew in the Collège de France, but the unorthodox views which he expressed in his very first lecture led to his dismissal from this post, which was not restored to him until 1871. The *Life of Jesus* appeared in 1863, and was followed by other volumes on the origin of Christianity and the history of the Church. These included *The Apostles, Saint Paul, Antichrist, The Christian Church* and *Marcus Aurelius.* A volume on *Memories of Childhood and Youth* gives attractive pictures of his early years. All the honors which France could pay to a scholar were given to him in his latter years.

RENFREW, *ren'froo,* a town in Renfrew County, Ontario. It is fifty-five miles by rail west of Ottawa, on the Grand Trunk and Canadian Pacific railways, and on the Bonnechère River and Smith's Creek. Most of the territory in the vicinity is good farming land, and the town boasts of "the best creamery in Canada." It also has flour and woolen mills, a separator factory, and lumber, lath, sash and door factories. After the outbreak of the War of the Nations it also acquired several munitions factories. The town owns and operates its power plant (cost $200,000), waterworks (cost $165,000) and electric street-lighting system. The army barracks; the opera house, built at a cost of $75,000, and the Renfrew Temperance Hotel, completed in 1914, are noteworthy structures.

Renfrew was settled in 1895, and was incorporated as a town in the same year. It takes its name from a borough and county of Scotland, and most of its residents are Scotch-Canadians. Population in 1911, 3,634; in 1921, 4,906.

RENI, *ra'ne,* Guido. See Guido Reni.

RENNES, *ren,* a city of France, the capital of the department of Ille-et-Vilaine, is situated at the meeting of the Ille and Vilaine rivers, about 234 miles southwest of Paris. As the junction of several important railway lines between Paris and the northwest of France, the city is in a location to command an extensive commerce, which is further aided by good rivers and canal navigation. It is also the center

from which the abundant farm produce of the neighborhood is transported, and it carries on an active trade in its own manufactures, including sailcloth, table linen, agricultural implements and lace. The River Vilaine, which divides the city into the upper (or new) town and the lower (or old) town, is spanned by four bridges. A fire in 1720 destroyed almost 4,000 houses, since which time Rennes has been rebuilt as a modern city, though there still remain walls, towers and gates of the medieval period. The cathedral in the Italian style of architecture, the university buildings, palace of justice, the Hotel de Ville, and the Lyceum are the most noteworthy buildings. In normal years the university has an enrolment of over 1,400. There is an excellent botanical garden. Population in 1921, 82,241.

RE'NO, NEV., the county seat of Washoe County, and the largest city of the state, with a population of 10,867 in 1910, and of 12,016 in 1920, a gain of 10.7 per cent. It is one of a famous group of mining cities in Western Nevada, and is thirty-one miles north of Carson City, the state capital, and 243 miles northeast of San Francisco. Its railroad service is provided by the Southern Pacific; the Nevada, California & Oregon, and the Virginia & Truckee lines.

The city covers an area of three square miles, and is picturesquely located at an altitude of 4,484 feet in a valley in the eastern hills of the Sierra Nevada Mountains. It is on the Truckee River and on the Truckee-Carson Canal, an irrigation project thirty miles in length, constructed by the Federal government at a cost of $8,500,000. This canal reclaims an area of 206,000 acres, a part of the fine farming region about the city. Mining, stock raising and agriculture are leading interests. In 1920 there were 53 factories in the city, capitalized at $2,687,000, according to the Federal census. The value of the products in that year of high prices was $4,863,000.

Reno is the seat of Nevada State University (which see), a department of which is the noted Mackay School of Mines. Other prominent features of the city are the state hospital for mental diseases, the United States Agricultural Experiment Station, Federal building, Carnegie Library, county courthouse, city hall, Y. M. C. A. building, hospitals, Riverside and Powning parks, and the Moana and Laughton Mineral springs. Reno was settled in 1868 and was incorporated as a town in 1879. A city charter was granted in 1899 but was revoked two years later. Reno again became a city in 1903. The city has acquired an unusual reputation because of the ease with which a divorce can be obtained there. C.T.S.

RENSSELAER, *ren'seh ler,* N. Y., a manufacturing city in Rensselaer County, situated on the Hudson River about midway between the northern and southern borders of the state. It is opposite Albany, the state capital, with which it is connected by three bridges, and is six miles south of Troy. The Boston & Albany and the New York Central & Hudson River railways serve the city, and electric lines connect it with Albany, Troy and adjacent cities and towns south, as far as Hudson. Steamboats connect Rensselaer with many points on the river.

Rensselaer is important chiefly as a transportation center, a large number of its people being employed in the railroad shops, roundhouses and freight yards. There are factories for making furniture, medicines, picture frames, dyes and skirts, yet many people of Rensselaer find employment in Albany and Troy, excellent transportation service making these towns easily accessible. The city has a park, an orphans' home and Saint John's Academy. Fort Cralo, built in 1642, the Franciscan Fathers Home and Genet Barracks are features of interest. The place was settled by the Dutch as early as 1631, when it was known as Greenbush. It was incorporated as a village in 1815, and in 1897, when the present name was adopted, it was chartered as a city. Bath was annexed in 1902. The population increased from 10,711 in 1910 to 10,823 (Federal census) in 1920. The city has an area of three and one-half square miles.

RENT, in the sense in which the word is oftenest spoken, is a sum which a tenant owes at intervals to his landlord for the use of land or of buildings or parts of them. But in the science of economics there is quite another meaning for the word—one which is in a way restricted, in a way enlarged, but at any rate entirely different.

Rent in Economics. If you pay a man forty dollars a month for the privilege of cultivating some farm land that belongs to him, you ordinarily do so because you believe that with the farm you can make at least forty dollars more than by working for wages. That is, the farm gives you an advantage, and it is this advantage which in economics is called rent, not the forty dollars which you pay to secure it. Thus economic rent is not what you give for the land, but what you gain from it.

The restriction which has been mentioned is this—that economic rent comes only from land, not in any degree from buildings which may be upon it. Buildings, in so far as they help in production, are capital, and the advantage gained from them is interest, not rent (see INTEREST). If the farm which you rent for forty dollars has a granary upon it, part of what you pay is for interest on that. In the actual transaction you make no distinction between what the land is to earn and what the granary will, but in economic reasoning this distinction must be made, because the economic laws which govern rent and those which regulate interest are very different.

Why Rent Exists and How Its Amount Is Determined. If there were an unlimited amount of the best land there would be no rent, for certainly no piece of ground would be of advantage to anyone if he could get another just as good without effort or expense. And, as it is the limit of supply which causes rent, so the factors which influence the limitation, which make land good, better or best to possess, are those which control its rent. Chief among these factors are the qualities which nature gives the land, its location and the number of people who could reap its advantages.

The easiest way of grasping the simpler principles of rent is to suppose the case of the settling of a small island. The first man to arrive takes a part of the best land. The second, when he comes, finds that there is still some land equally good, so of course he has no wish for the first man's farm; that is, there is as yet no rent. Now, however, a third settler appears. For him there is only second-grade land, on which he can raise a crop of two thousand bushels with the same labor which would bring him three thousand on either of the other two farms. So these two now have a rent of a thousand bushels each, for this is their advantage over the *no-rent* or *marginal* land, as the other is called, since it is the poorest which it is worth the newcomer's while to consider. Soon a settler arrives who can find no unoccupied land which will yield him more than one thousand bushels. This land now becomes the marginal land, and a second-grade farm has a rent of one thousand bushels, a first-grade farm of two thousand.

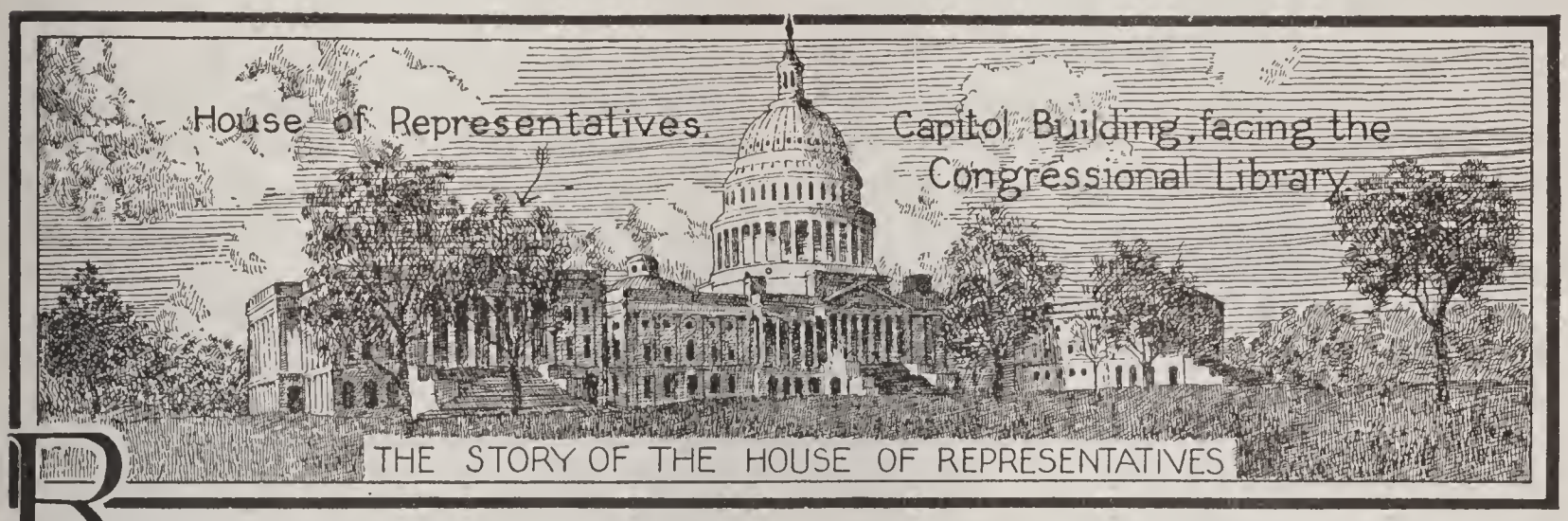
The Selling Price of Land. When the third settler arrived on the imaginary island the farms of the first two acquired a rent of one thousand bushels. Assuming this quantity of the commodity raised to be worth $500, how much can this man afford to pay for one of the farms? The answer, of course, is a sum which, if invested elsewhere, will return him $500 each year. If the prevailing rate of interest for investments of corresponding degree of safety is five per cent he can pay $10,000; if interest is six per cent, $8,333. The actual price at which land sells is never so easily determined, however, because the future is more to be considered than the present. In the days to come the prices of agricultural produce may advance or recede; interest may move up or down; settlers may come to the island and increase rental values; railroads may be built which will decrease the difference in value of near-by and far-off lands. Many such possibilities must be considered by both purchaser and vender. This is one reason why a knowledge of the principles of rent may become an extremely valuable asset to any man or woman.

To Whom Does Rent Belong? Because rent depends on the presence of people and so, in a sense, is created by the community, there are many people who believe that private ownership of land or appropriation of its rents is unjust. The claim, of course, meets strenuous opposition, but it is gaining in popularity. Interesting information on this point will be found under the heading SINGLE TAX, and the story of the remarkable experiments of one government in the article NEW ZEALAND. C.H.H.

REPLEV'IN. A owned a pasture adjoining B's cornfield. Two of A's cows broke down the fence and destroyed a portion of B's corn. B found the cows in his field and drove them to his barn. He refused to return them to A until he received full compensation for the corn destroyed. A appealed to the court for a writ directing the sheriff to seize the cows and return them to him. A's action in law constituted a *replevin;* that is, an action to recover goods or chattels that have been unlawfully taken, or that are unlawfully detained. In a writ of replevin the sheriff is directed to seize the property described and to return it at once to the party from whom it was taken, who is known in the case as the *plaintiff.* In his application for replevin the plaintiff must assure the court by his bond, or otherwise, that whatever damages the defendant may be found entitled to will be paid. When the action is decided in favor of the plaintiff he is entitled to recover his property; in case it cannot be restored he is entitled to an equivalent cash value, together with such damages for its wrongful seizure as the court may allow. In case the de-

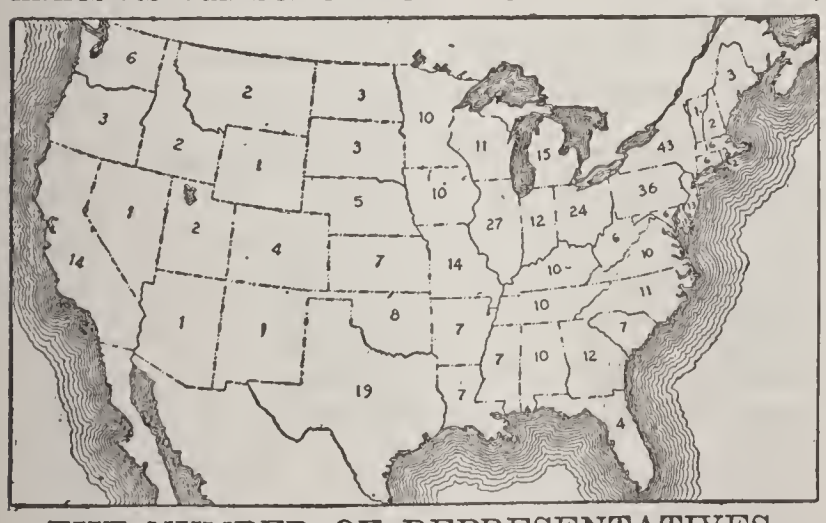
fendant is unable to pay, the plaintiff may bring suit against the defendant's bondsmen.

REPPLIER, *rep'leer,* AGNES (1855-), an American essayist, born at Philadelphia. After graduating at Sacred Heart Convent, Torresdale, Pa., she at once began a literary career by contributing to numerous magazines. In 1888 she wrote her first book, *Books and Men;* this was followed by *Points of View, Essays in Idleness, The Fireside Sphinx, In Our Convent Days, Americans and Others* and *The Cat.* She has a delightful way of tingeing her discussions with light banter and harmless irony, with the result that her writings on even most serious subjects are interesting and entertaining. *In Our Convent Days* is especially pleasing.



REPRESENTATIVES, HOUSE OF, the lower branch of the Congress of the United States, coördinate in most of its powers with the upper house, the Senate, and patterned originally after the English House of Commons. The Constitution prescribed the general organization of the House, but left the details of operation to the members themselves. The number of members is always to be self-determined, the Constitution providing that the number of Representatives should not be more than one for every 30,000 people; until the first census should be taken the membership was fixed at sixty-five.

After each Federal census the House determines its number of members for the next ten-year period. When this has been decided the ratio of representation is found by dividing the population of all the states by this number; the quotient represents the number of people who are entitled to one Representative. Dividing this ratio into the population of any state, the number of Representatives that state is entitled to send to Congress is found. The state then proceeds to divide its territory into districts, as many districts being provided as its allotment of Representatives, so all parts of the state may be represented in its Congressional delegation. It is not a legal necessity that this division into districts be made, so far as the attitude of Congress is concerned. It would satisfy every qualification as to residence if all of the state's delegation were from the same section or from the same city. Even with the district formation it would be legal if the voters of any district were to choose as their Representative a resident of some remote part of the state. Of course this is never done; each district is always able to furnish suitable men, thus retaining its local representation in Washington.



THE NUMBER OF REPRESENTATIVES

The apportionment indicated above was made in 1921 for the ten-year period beginning March 4, 1923, and ending March 4, 1933.

The membership of the House of Representatives since the foundation of the government, as specified by law for each ten-year period, is given below:

PERIOD	NUMBER OF MEMBERS	RATIO OF POPULATION	PERIOD	NUMBER OF MEMBERS	RATIO OF POPULATION
1789-1793	65	.....	1863-1873	241	127,381
1793-1803	105	33,000	1873-1883	292	131,425
1803-1813	141	33,000	1883-1893	325	151,911
1813-1823	181	35,000	1893-1903	356	173,901
1823-1833	212	40,000	1903-1913	386	194,182
1833-1843	240	47,700	1913-1923	433*	211,877
1843-1853	223	70,680	1923-1933	435	242,267
1853-1863	234	93,423			

*Increased to 435 by the admission of New Mexico and Arizona.

If during a decade a new state is admitted, the whole number is increased by that state's allotment.

A member of the House, by Constitutional provision, must be twenty-five years of age, must have been for seven years a citizen of the United States, and must be a resident of the state from which he is chosen. The term of service is two years; the terms of all members expire on the same day, for the House is not a continuous body, as is the Senate. Elections occur in the autumn of even-numbered years, and Representatives then chosen assume office on March 4 following, although unless called in special session Congress does not meet until December, over a year from the date of election. The long interval between elections and the meeting of Congress was necessary in the early history of the country, for months were required to travel from the Western states to the national capital. The question of changing the present order has been seriously considered, but for a more important reason than the above. When the people vote for a change of governmental policy it is now usually thirteen months before members elected to put that policy into effect can begin their work.

The powers and duties of members are named in the Constitution, Art. I, Sec. 8. The House has two distinct powers that are denied the Senate; all bills for raising revenue (tariff bills) must originate in the House, and that body has the sole power of impeachment. For various rates of pay of a Representative in Congress, see CONGRESS OF THE UNITED STATES.

State House of Representatives. In every state legislature the house of representatives is the lower house, as in Congress; it is often called the *assembly*. The states have patterned their legislative departments after the national law-making body; the differences in them are slight, principally relating to the number of members, length of term and amount of salary. The membership in the House of Representatives of a state will vary from fifty to about 200; the compensation from $3 per day, for services actually rendered, to about $1,200 per year. The term of service is usually two years, but is four years in a few states. E.D.F.

Related Subjects. In connection with this article on the House of Representatives, the reader is referred to the following articles in these volumes:

Congress of the United States	Impeachment
Constitution of the United States	Legislature
	Senate
	Tariff

REPRIEVE, *re preev',* the suspension to a certain future date of a sentence of capital punishment passed on a criminal. Reprieves are usually granted to allow inquiry into the legality of the conviction, or to give time for examination of alleged fresh evidence. The power to grant a reprieve is vested in the chief executive of a state or nation, but a state executive's power to grant a pardon is sometimes limited by the superior authority of a board of pardons. See PARDON.

REPTILES, *rep'tilz,* a class of cold-blooded, scaly vertebrates, which wriggle along on the belly or crawl on small, short legs. The snake is not, as many suppose, the only reptile. The family is much more numerous, and is represented on the earth at the present time by lizards, turtles, crocodiles and alligators, as well as by snakes. In the remote early period when the earth swarmed with huge, ungainly monsters of all sorts, the reptile family was represented by forms even stranger than those of today—such creatures as the ichthyosaurs, dinosaurs and the pterodactyl. The last of these is especially interesting because it shows the early kinship between reptiles and birds, for the pterodactyl (which see) had wings and flew. The young of reptiles, in nearly all species, are hatched from eggs, and differ little from their parents except in respect to size. They have no gills like the fish, but breathe altogether through the lungs, though many of them spend much time in the water.

Related Subjects. A detailed and systematic knowledge of this class of animals may be gained from a study of the following articles

Adder	Gila Monster
Alligator	Glass Snake
Anaconda	Iguana
Asp	Leatherback
Black Snake	Lizard
Boa	Milk Snake
Box Tortoise	Moccasin Snake
Chameleon	Monitor
Cobra	Mud Turtle
Copperhead	Python
Crocodile	Rattlesnake
Dragon	Terrapin
Garter Snake	Tortoise
Gavial	Turtle
Gecko	Viper

See, also, BIRD.

REPUBLIC, *re pub'lik,* that form of government in which the supreme power rests in the whole body of its citizens, or, technically, in that part of the whole body which possesses the right to vote. Control of the affairs of such a government is exercised through citizens elected by the whole people, who delegate to such se-

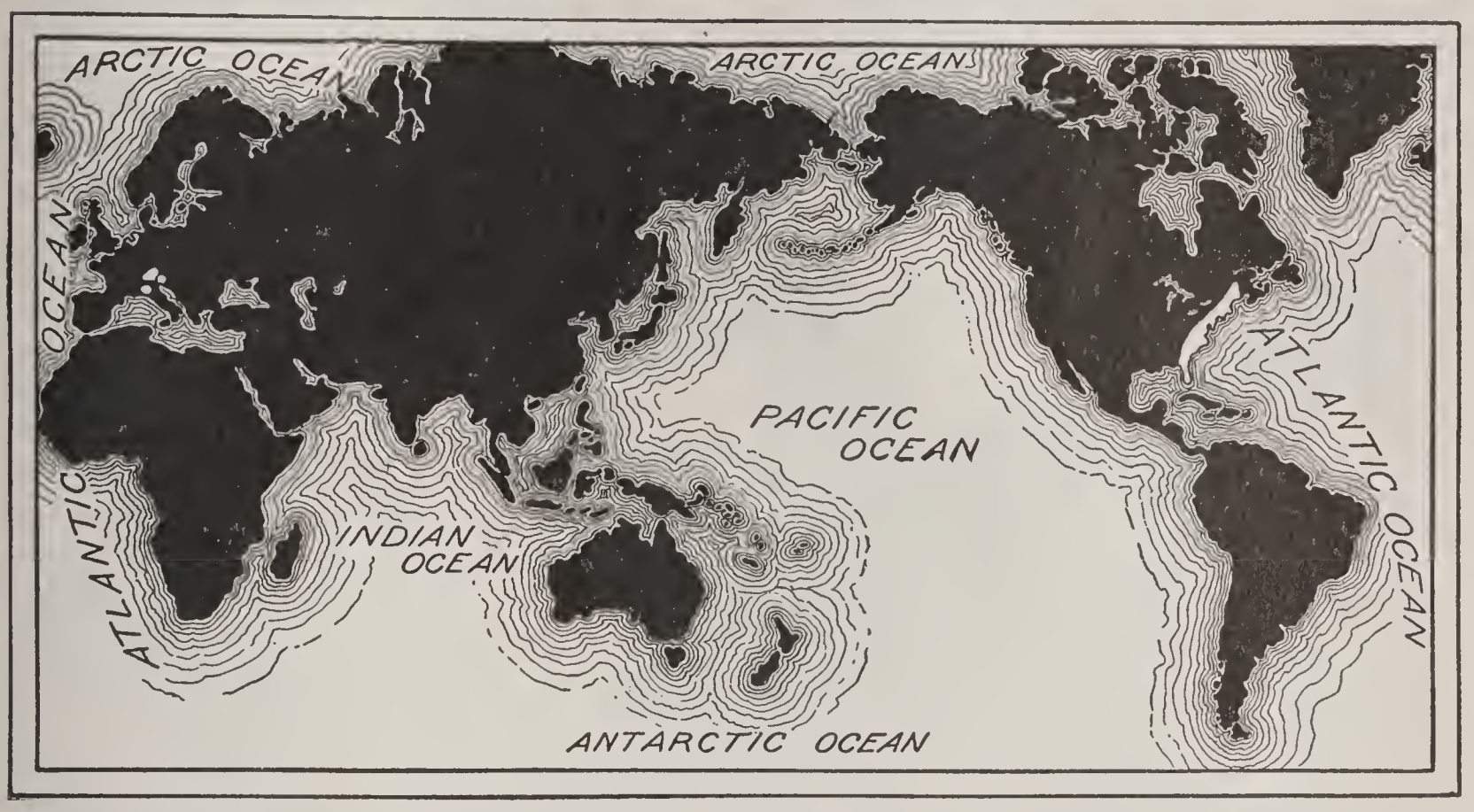
lected officials authority for short periods to maintain the necessary power. In theory, the authority of any official extends no further than the limits imposed by the citizen body, as expressed by their votes, and officials are expected to regulate their actions according to the known will of the people whom they represent.

A republic is a near approach to a pure democracy. In the latter all the people meet together in one place to frame their laws, and to instruct selected persons to carry them into execution. If a country is so large and the population is so great that a common meeting place for legislation in which all may participate is impossible, laws are enacted by a representative assembly, composed of delegates selected by the mass of the people; these make the laws and other citizens selected by the people execute them. The latter form of government is then termed a *republic;* another name for it, and one which is self-explanatory, is *representative democracy.*

The United States is the most conspicuous example of a successful republic in the world. The republic of China is the largest in area, and the least stable; the republic of San Marino is the smallest, and its stability is guaranteed by Italy. In Europe, after decades of struggle, France became a republic and has established a thoroughly able representative government. Switzerland, since its independence was declared in the Napoleonic era, has become one of the most progressive of the world's republics. Portugal deposed its king in October, 1910, and instituted a republican form of government, which was recognized by the nations early in 1911. In March, 1917, Russia deposed the Romanoff dynasty and proclaimed itself free, with republican leanings. With the defeat of the militaristic Germanic powers in 1918 several new republics sprang up in Europe.

The list is as follows:

NORTH AMERICA. United States, Mexico.



REPUBLICS OF THE WORLD IN 1776

The white areas, Genoa, Venice, Switzerland, the Netherlands and the United States, were the only democratic governments on the earth. The black areas represent monarchies and their dependencies. In these freedom of the individual had not been attained; the king and his counselors determined national policies.

CENTRAL AMERICA. Guatemala, Honduras, Panama, Costa Rica, Nicaragua, San Salvador.

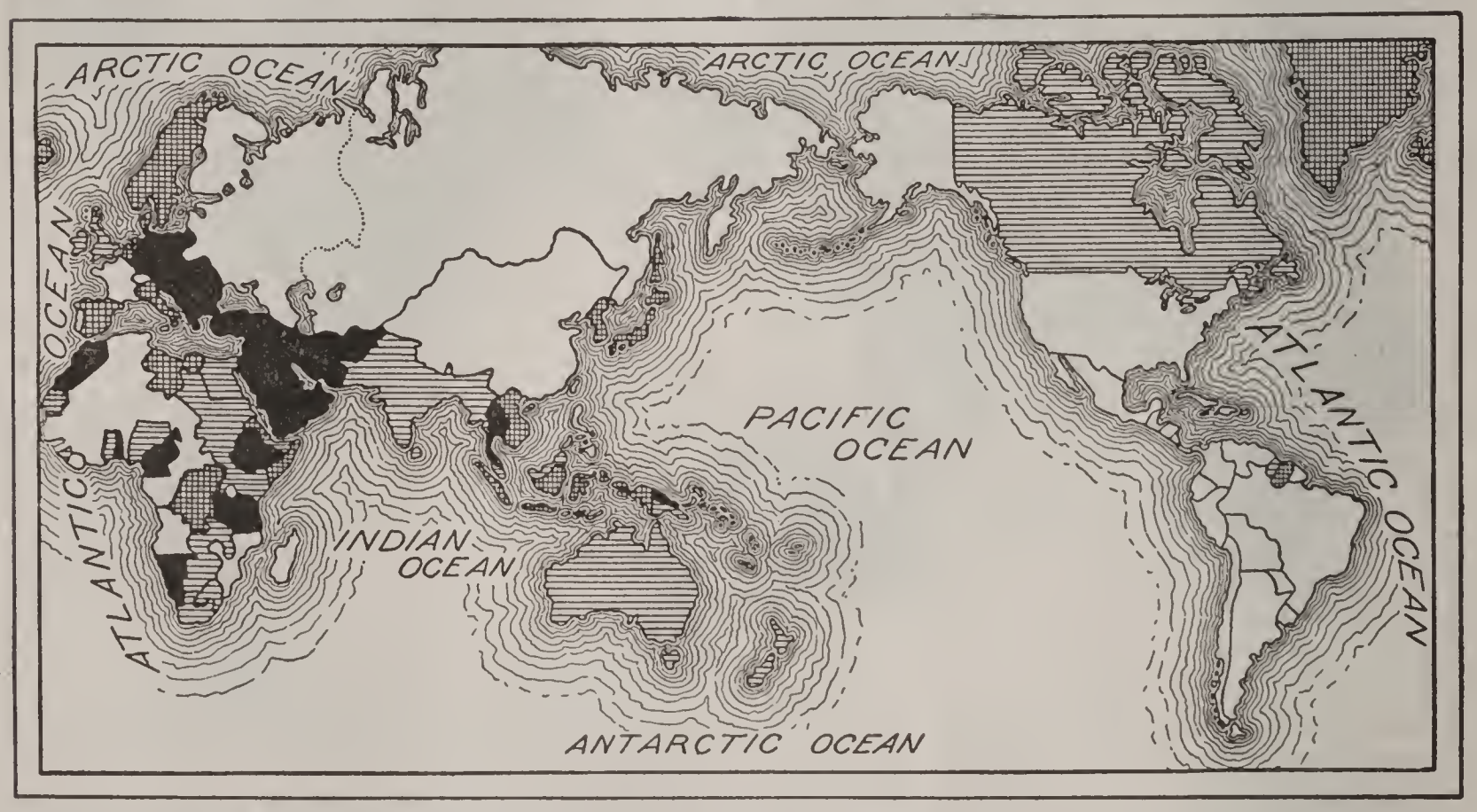
SOUTH AMERICA. Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, Venezuela.

EUROPE. France, Russia, Portugal, Switzerland, San Marino, Andorra, Czecko-Slovakia, Poland, Jugo-Slavia, Hungary (?), Austria (?), Germany (?).

ELSEWHERE. China, Cuba, Dominican Republic, Haiti, Liberia.

Growth of Republics. The accompanying maps show the rapid increase in representative government since the adoption of the Declaration of Independence by the United States in 1776. At that date the United States was the only important nation having a republican form of government. In Europe, Genoa and Venice claimed to be republics, but they were ruled by officials chosen by the aristocracy, and Swit-

zerland was free. A constitutional monarchy in which the monarch holds only a social title is virtually a republic. The British Empire with its self-governing colonies—Canada, Australia, New Zealand and South Africa—is the best representative of such a government. In 1919 the combined area of the republics of the world was 30,700,000 square miles, and their combined population was 850,000,000, or more than half the population of the world. If to these totals we add those of the free British Empire the total area is 41,500,000 square miles, and the total population 1,250,000,000, or more than three-fourths the population of the world.



REPUBLICS OF THE WORLD

The white areas represent the growth of democracies within about 150 years. The black spaces are autocratic monarchies and their dependencies; horizontal shaded, the British Empire, whose citizens are as free as those of republics; crossed lines, constitutional monarchies, in which a large measure of freedom exists.

Older Republics. Governments bearing the name of republics have existed in all ages within the range of civilization. The ancient Roman republic was originally an aristocracy controlled by the patrician element; ambition changed it to an empire. In ancient Greece there was an illustrious example of pure democracy. The Italian republics of medieval times were oligarchies. W.F.R.

Related Subjects. Much correlative material will be found in the following articles in these volumes:

Aristocracy
Government
Monarchy
Oligarchy
Theocracy

REPUBLICAN PARTY, one of the great political parties of the United States, organized in the years 1854 to 1856 as a protest against the extension of slavery. The name *Republican* was also used about 1792 by the followers of Jefferson, and by the adherents of Henry Clay and John Quincy Adams about 1825 (see WHIG), but these names were current only a few years, and in common usage the name Republican is given only to the party which elected Lincoln to the Presidency in the autumn of 1860.

The Republican party owed its existence to the effort to extend slavery into the territories, and to the inability or unwillingness of the Whigs as a party to take vigorous steps in opposition. The Northern Whigs were already displeased by the passage and enforcement of the Fugitive Slave Law of 1850, but the Kansas-Nebraska Bill led to open revolt. On February 28, 1854, three months before the latter bill was passed, a local mass meeting of voters opposed to slavery met at Ripon, Wis., and adopted resolutions declaring that if the Kansas-Nebraska Bill became a law they would "throw old party organizations to the winds, and organize a new party on the sole issue of the nonextension of slavery." The local party was soon organized, and the name *Republican* was suggested almost at once as suitable for the new party. It was in Michigan, however, on July 6, that the opposition to the extension of slavery first led to a real party organization

which formally adopted the name Republican. In Maine, Massachusetts, Ohio, Illinois, Wisconsin and other states, conventions were held during the summer of 1854, and almost at once the Republican party became a power in the North. In the fall of 1854 the Republicans elected eleven United States Senators and secured a plurality in the House of Representatives.

This sudden growth was due to the fact that nearly all opponents of the extension of slavery at once joined the party. Among the Republicans were most of the antislavery Whigs, including Lincoln, Seward and Greeley; all the Free-Soilers, like John P. Hale and Charles Sumner (see FREE-SOIL PARTY); most of the Know-Nothings, including Nathaniel P. Banks and Schuyler Colfax, and a few Abolitionists who felt that the new party offered the best means of real opposition to slavery. Besides these complex elements there were a few Northern antislavery Democrats, like Simon Cameron, Hannibal Hamlin and William Cullen Bryant, who favored the Republican cause.

These elements were all represented in the first national convention of the party, held in Philadelphia in June, 1856. All the Northern states sent delegates, as did Virginia, Maryland, Delaware and Kentucky. The platform's chief plank declared that it was both "the right and the duty of Congress to prohibit in the territories those twin relics of barbarism, polygamy and slavery." John C. Fremont, the first Republican candidate for President, received 1,341,000 popular and 114 electoral votes to Buchanan's 1,800,000, and 174. Fremont carried the North, with the exception of five states; Buchanan carried the South. The Republican party had created an issue which for the first time established what became notable later as the "solid South." Four years thereafter, though still a minority party, it was stronger than any one of the Democratic divisions, and elected Lincoln as President. The platform of 1860 is noteworthy for its moderation; it denounced threats of disunion and declared that the rights of the individual states must be held sacred; but it also stated that "the normal condition of all the territory of the United States is that of freedom, which Congress is bound to preserve and defend." Four years later the War of Secession had so crystallized the issues that the Republican platform openly declared slavery the cause of the war, and demanded its "utter and complete extirpation from the soil of the republic."

Tucked away inconspicuously in these platforms was a plank favoring a protective tariff, an issue which later gave the party a powerful hold upon the nation. When the war was ended and slavery abolished, the Republican party was left without positive aim, its great mission having been accomplished. In this extremity the party leaders secured the nomination of Grant, who was not a politician, and who had been a Democrat before the war. It is, indeed, quite certain that if Grant had not been nominated by the Republicans he would have been chosen by the Democrats. Grant's personal popularity, added to the disfranchisement of the whites in the South and the enfranchisement of the negroes, made his election certain. The Republican party clung to the old war issues, which were the chief themes of its orators, and did not see the necessity of newer and more vital questions. In 1872 a few leaders, including Sumner, Greeley, Schurz and Charles Francis Adams, organized the Liberal Republican party, which sought to quiet the sectional bitterness and bring forward new issues. But the Republican party, secure in public confidence because of past achievements and its vigorous defense of the protective tariff, reëlected Grant.

Grant's second administration was marked by the panic of 1873, the Credit Mobilier scandals, the exposure of the Whisky Ring and other events which tended toward disquiet. The nomination and election of Hayes, followed by the end of reconstruction in the South, ended the discussion of war issues. The topics of the day then became civil service, bimetallism, resumption of specie payments and other financial issues, and, lastly, the tariff. From the beginning of its existence the party had been committed to a high protective tariff, and on this issue it won many elections. In 1884 Cleveland was elected chiefly because the Republican mugwumps declined to vote for Blaine, and in 1896 free silver was the deciding issue, but in every other election the tariff question has been uppermost. The high-water mark in tariff legislation was the McKinley Bill, which brought about the election of William McKinley as President in 1896; that year the issue which overshadowed the tariff, however, was the money question—free silver or the gold standard. Only twice—in 1892, when Cleveland was elected, and in 1912, when Wilson was chosen—did the Democratic policy of low tariff secure a victory. The election of President Wilson, however, was primarily due to a breach

in the Republican ranks, resulting in the defection of Theodore Roosevelt and his adherents and the organization of the Progressive party. In 1916 the tariff was not an issue; Woodrow Wilson was reëlected on his record. In 1920 the Republicans won by the greatest majority ever recorded. W.F.Z.

REQUISITION, *rek wi zish' un.* See EXTRADITION.

RESACA DE LA PALMA, *ra sah' kah da lah pahl' mah,* BATTLE OF, an engagement between American and Mexican troops in Cameron County, Texas, following which Congress declared war on Mexico (see MEXICAN WAR). The battle, which occurred on May 9, 1846, was a victory for the United States. General Zachary Taylor commanded the American force, numbering 2,300, and the 5,000 Mexicans were led by General Arista. Resaca de la Palma is a ravine four miles north of Brownsville. The battle was fought in disputed territory, as Mexico claimed as its northern boundary line the Nueces River, instead of the Rio Grande. The day before this battle another was fought at Palo Alto (see PALO ALTO, BATTLE OF).

RESERVOIR, *rez' er voir,* in its broadest sense, a large receptacle for storing liquids or gases, but in the sense in which the term is ordinarily used it is a large receptacle for storing water to be used in irrigation, for city purposes or for power to operate machinery. A lake is a natural reservoir, and some cities obtain their entire water supply from lakes. Glasgow, Scotland, obtains its water from Lock Katrine, and Lake Michigan constitutes the source from which the people of cities along its shores obtain their supply. A *cistern* is a very small reservoir for storing rain water for family use.

An artificial reservoir for public use is made by constructing a dam across a narrow valley or by excavating a basin in a comparatively level tract of land. The greatest of engineering skill is often required in its construction. The site should be selected with care, if the water is to be used for household purposes. The sources from which the reservoir is to be filled should be free from animal and vegetable impurities, and the ground which is to form the basin should be cleaned of all vegetation and soil containing animal and vegetable matter. A concrete bottom is an additional protection against contamination of the water. Since animal and vegetable matter are sources of disease-bearing germs, every precaution should be taken to keep the water free from them. Reservoirs made by excavation are usually surrounded by fences to protect them from intruders.

Some of the largest reservoirs for impounding water for city use are the Croton and Ashokon reservoirs which supply New York City, and the reservoir of the Metropolitan Water Supply District of Boston. Some small cities have their water stored in large tanks supported upon high, steel framework so that the pressure will be sufficient to force the water to the tops of the highest buildings. These tanks, called *standpipes,* were formerly very common in level sections, but they have not always met expectations; the water pressure has often been too low.

The largest reservoirs are those for storing water for irrigation. In the United States the construction of the works connected with large irrigation projects is under the direct control of the United States Reclamation Service. See IRRIGATION; WATERWORKS.

RESINS, *rez' inz,* a class of vegetable substances used extensively in the preparation of varnishes, and to some extent in medicine. A familiar method of classification divides them into three classes: (1) those which exude from plants spontaneously or from cuts made in stems and branches; (2) those extracted from the wood by the use of hot alcohol or other solvent, and (3) fossil resins, such as gum copal and amber (which see). A typical resin is transparent or translucent, yellowish or brownish in color, insoluble in water, but soluble in alcohol, ether and volatile oils. It melts and burns easily and can be charged with negative electricity by friction. Resins are found in those substances known as gum resins (which see), such as asafetida, aloes and myrrh, and in balsams, a group of liquid or half-solid substances including benzoin and storax. When combined with essential oils they are known as *oleoresins.* The common resin of commerce, which exudes from several species of pine, is described under the heading ROSIN.

RESPIRATION, *res pi ra' shun.* See BREATH AND BREATHING.

RESTIGOUCHE RIVER, *res ti goosh',* a small Canadian river, forming a part of the boundary between the provinces of Quebec and New Brunswick. It is probably the most famous trout and salmon stream in the world. Like the Miramichi and other rivers in this part of the Dominion, it flows through territory much of which is still wild, and offers great inducements to the sportsman as well as the

lumberman. The Indian word *Restigouche* means "the river which divides like a hand," and was given to the stream in allusion to its five branches, the Matapedia (meaning Musical), the Upsalquitch (Blanket), the Kedgwick (Large), the Patepedia (Little), and the Wagan (Knife).

The main course of the Restigouche is about 125 miles long. From the confluence with the Matapedia to the mouth,—about thirty miles—it has an average width of four miles. The tides are noticeable for twenty-four miles from the mouth, and large vessels ascend as far as Campbellton, about fifteen miles from Chaleur Bay, into which the river empties. The tributaries, five in number, are from fifty to seventy miles long. H.V.B.

RESTORATION, *res toh ra' shun,* in English history, the return to monarchy in 1660, after the Cromwell ascendency. It was signalized by the recall of the House of Stuart, in the person of Charles II. The tyrannical Charles I was beheaded in 1649, and England became a Commonwealth under Oliver Cromwell. The latter was a strong, capable administrator, and as long as he lived the republican government which he established was respected and successful. But his son, Richard, who succeeded him as Lord Protector, had not inherited the father's strong will or political ability, and the army finally forced him to abdicate (1659).

The army then undertook to control Parliament, compelled it to dissolve, and aroused great opposition by its high-handed methods. Unsettled conditions led General George Monk, supported by the Scottish army—always loyal to the Stuarts—and a part of the English forces, to reassemble the Long Parliament, order it to dissolve, and call a general election. The new Parliament voted to invite Prince Charles, the exiled son of Charles I, to take his seat upon the throne. When he journeyed to London for the coronation he was greeted everywhere with wild enthusiasm. His reign was dated back to the execution of Charles I instead of the actual year of the restoration, and those who had played leading parts in his father's trial were put to death. So strong was the reaction to royalty that the great Cromwell's body was dragged from its grave and hanged.

Related Subjects. In connection with the Restoration, the reader is referred to the following articles in these volumes:

Charles (England)	Cromwell, Oliver
Commonwealth of England	Long Parliament
	Monk, George

RESURRECTION, *rez u rek' shun,* the restoration of the dead to life. Belief in the resurrection of the dead was dimly held in late Old Testament times; it was somewhat further developed by the sect of the Pharisees, but was clearly formulated only in the New Testament, on the basis of the resurrection of Jesus. The best proof offered that Jesus did rise from the dead is the effect the event has had on His followers. Only faith in a living leader can explain the zeal of the early Christians, their simple, unflinching heroism and the conquering power of their message; and the same faith must account for the triumphs of Christianity to the present day.

The manner of the resurrection, however, has been a subject of much conjecture, and men have never answered to their entire satisfaction the question discussed by Paul (*I Corinthians* XV, 35), "How are the dead raised? and with what manner of body do they come?" Some interpret the appearance of Jesus described in the Gospels as occurring after the resurrection, as being that of a glorified body, the result of the most stupendous of miracles. Others believe that, while the appearances were real, they were not physical manifestations, but inner revelations, or visions, such as Paul experienced on the road to Damascus (*Acts* XXII, 6-11). The former view is the one that has been most widely accepted by the Christian Church.

RESURRECTION PLANT. See JERICHO ROSE.

RESZKE, *resh' ke,* DE, the family name of two Polish brothers who became famous as singers in opera.

Jean de Reszke (1850-) early attracted notice as a boy soprano in the cathedral at Warsaw. He made his first appearance in opera in 1874, as a baritone, singing the part of Alfonso in *La Favorita,* at Venice. For two seasons he carried baritone rôles, but, as it was apparent that he was singing parts too low for his voice, he retired from the stage at the end of his second season and for two years studied tenor rôles. His appearance as the tenor in Massenet's *Herodiade,* at Madrid in 1879, was the beginning of a great triumphal career, in which he became known throughout Europe and America as one of the most artistic singers and actors of the operatic stage.

His success was due to an admirable combination of voice, acting ability and attractive personal appearance. Among his notable rôles were Radames in *Aïda,* Raoul in *The Hugue-*

nots, and the name parts in *Faust, Lohengrin* and *Romeo.* He was for years a favorite star with the patrons of the Metropolitan Opera Company of New York. In 1904 he retired from the stage to establish a singing school in Paris.

Edouard de Reszke (1855-1917) won fame as one of the greatest dramatic bass singers of his time. He received his early musical training from his brother Jean, and made his first stage appearance in 1876 at the Theater of the Italians, in Paris, as the king in *Aïda.* He was frequently engaged to sing in the same company with his brother, and continued to appear at Covent Garden, London, and at the Metropolitan Opera House, New York, for several seasons after his brother retired. In 1907 he became a teacher of music in London. Among his successful parts were the king in *Lohengrin,* Marcel in *The Huguenots,* Mephistopheles in *Faust,* Hagen in Wagner's *Götterdämmerung* and Hunding in his *Die Walküre.* He died in Poland, at his estate in Erietrikov.

RETAIN'ER, the formal engaging of an attorney by a client to prosecute or defend a suit at law, or the engagement of an attorney by a client to act for him whenever the attorney's services are needed. A retainer of the first sort is *special;* of the second, *general.* The retainer is accompanied by a *retaining fee,* which is also called a *retainer.* The acceptance of the retaining fee prevents the attorney from accepting a retainer from the other party to the case, or, in case of a general retainer, from performing services that would be against the interest of his client.

RETRIEVER, *re treev'er,* a field dog trained to find and bring back game, especially waterfowl. There are two principal kinds, the English and the American, the latter known as the *Chesapeake Bay dog.* This American retriever, whose name comes from the district where he first won fame, is the finest dog of his kind. The coarse, thick hair, the color of sedge grass, covers a large, heavy frame that is built for strength and endurance. The dog weighs sixty-five pounds. His legs are rather short but very strong, and he has webbed feet. He is an expert swimmer and has an unerring scent, and is well fitted to cope with the largest and strongest birds and the roughest seas. There are two distinct varieties of the English retriever, one with a black curly coat and sleek head, and the other with a flat or wavy coat, either black or reddish-brown. English retrievers have been bred by crossing the spaniel and the Newfoundland dog, or the spaniel and the poodle, all of which are very keen of scent.

REUNION, *re yuhn'yun,* Ile de la, formerly Ile de Bourbon, an island situated between Madagascar and Mauritius, in the Indian Ocean, belonging to France. It has an area of 725 square miles and is of volcanic origin; it has now an occasionally active volcano, the Piton de la Fournaise, rising 8,713 feet above the sea. The climate is healthful, but the island is frequently visited by very destructive hurricanes.

Agriculture is the chief occupation, over one-third of the total area being cultivated. The principal crops are sugar, coffee, cacao, vanilla and spices. The tropical forests are wonderfully luxuriant. Commerce is extensive, being carried on, for the most part, with France and other French possessions. The capital is Saint Denis. The population is estimated at a little over 173,300, and includes Indian coolies, natives of Madagascar and Africa, and Chinese. The white population is small, and is more or less mixed with the colored races.

The island is represented in the French Parliament by one senator and two deputies.

REVAL, *ra vahl',* a coaling station and fortified seaport of Russia, and the capital of the government of Esthonia. It is picturesquely situated on a bay of the same name, an inlet of the Gulf of Finland (itself an arm of the Baltic), and is about 230 miles southwest of Petrograd. The upper part of the city occupies a rocky eminence and contains the cathedral, castle, governor's residence and the aristocratic quarters. The lower town still retains many relics of medieval times; special features of interest are the town hall, the Church of Saint Olai, with one of the highest spires in the world, a museum of Baltic antiquities (in the guild house) and a library of 60,000 volumes. Reval is a popular bathing resort and has two harbors. Among the Baltic ports of Russia it ranks third, following Petrograd and Riga. During the War of the Nations (which see) Reval was bombarded by the Germans, but was not captured. Population in 1910, 98,995.

REVELATION, *rev e la'shun,* Book of, the name frequently given to the last book of the New Testament, in the English version called the *Revelation of Saint John the Divine,* and known also as the *Apocalypse.* It is supposed to have been written by the apostle John when he was living on the Isle of Patmos, to which he had been banished. The first part contains a message to the churches; the second includes

a series of visions which are of such nature that there is a wide difference of opinion about their meaning, some modern scholars believing the apocalypse to have been written for the purpose of bringing together all the symbols of the Old Testament and showing them in their true relation.

REVELSTOKE, *rev'el stohk,* a city in the southeastern part of British Columbia, popularly called "the capital of Canada's Alps." It lies at the foot of the western slope of the Selkirk Mountains, and at the junction of the Illecillewaet and the Columbia rivers. The former, which has its source in the great glacier of the same name, is not navigable, but the Columbia is traversed by small steamers. Revelstoke is also served by the main line of the Canadian Pacific Railway and by a branch which gives access to the Arrow and Kootenay lakes region to the south. The city lies in the northwest part of the Kootenay country, and is about midway between the Grand Trunk Pacific Railway on the north and the Crow's Nest line of the Canadian Pacific on the south. Calgary is 267 miles east by rail, and Vancouver is 380 miles southwest. Population in 1911, 3,017; in 1921, 2,782.

Revelstoke has a large wholesale and retail trade, especially in the near-by mining districts. It has numerous manufacturing establishments, including sawmills, a sash-and-door factory and a cigar factory. It is also a railway division point, and has the Canadian Pacific repair shops. Since 1902 the city has owned and operated its waterworks and its electric light and power plants. Attractive features are the courthouse, completed in 1912 (seat of the county court for West Kootenay), the General Hospital, a splendid structure, and Columbia Park, which has an area of thirty-nine acres. From Revelstoke an automobile road runs to Mount Revelstoke, whose summit, now reserved as a national park, is a natural flower garden of great beauty. Everywhere in the vicinity there is magnificent scenery, and abundant opportunity is afforded for hunting with gun or camera. Revelstoke is also famous for its sports—fishing, boating, lacrosse and other games in summer; skiing, ice hockey and sleighing in winter. The city was founded and incorporated in 1899, and was named in honor of Edward Baring (1828-1897), first Baron Revelstoke, and for many years head of the famous English banking firm of Baring Brothers.

REVENUE-CUTTER SERVICE, an armed maritime service of the United States. It has existed for over 125 years of the lifetime of the republic and was the first naval service of the Union, owing its establishment to Alexander Hamilton, the first Secretary of the Treasury. In January, 1915, the United States Coast Guard was created by act of Congress, bringing under one division two existing organizations, the Revenue-Cutter Service and the Life-Saving Service (which see). Both operate under the Treasury Department in time of peace, but in time of war the Coast Guard becomes automatically a part of the navy.

Duties. The most important work of the Revenue-Cutter Service is rendered in time of peace, in the enforcement of statutes affecting the country's interests at sea. This includes customs, neutrality and quarantine laws; the destruction of derelicts (boats which have been abandoned), the suppression of mutiny, piracy and illegal traffic in firearms; the inspection of lighthouses and the examination of the condition and life-saving equipment of vessels.

Certain cutters are detailed to coast-patrol service from West Quaddy Head, Maine, to Cape Fear, during the months between December and April, for the purpose of giving aid to steamers in distress and of caring for the shipwrecked. Other boats in the service are required to patrol Alaskan waters from May to December, to protect the seal fisheries, to rescue lost or wrecked seamen and to give medical aid to the scattered inhabitants of the coast. In these waters alone the service has rescued hundreds of whalers who otherwise would have perished. It is said that the revenue service "blazed the way to Alaska," and for many years after that possession was acquired, the cutters were the only representatives of the authority of the government in the waters north of Sitka.

One vessel is detailed to give medical aid to the fishing fleets of the North Atlantic, and by an international agreement among the great maritime nations, several cutters patrol the ice fields of North America to guide and aid ships. A number of cutters are assigned to service in the Great Lakes during the navigation season and others are detailed to harbor duty. The officers of the service are required to inspect, drill and discipline life-saving crews, and the present efficiency of the Life-Saving Service is largely due to the excellent training the men have received. In 1917, after the resolution that a state of war existed between the United States and Germany had been adopted, a number of revenue cutters were stationed along the Atlantic coast to serve against submarines.

Organization. There are five divisions in the service, with headquarters at Boston, New York, San Francisco, Seattle and Unalaska, Alaska. The first revenue-cutter fleet, organized in 1790, seven years before the first United States warship was launched, consisted of ten small, single-masted sailing vessels, each manned by a master, three mates, four marines and two boys. In 1915 there were in the service forty-four steam vessels, twenty-five of them having a tonnage ranging from 400 to 1,700; nineteen harbor and anchorage boats; 159 line officers; eighty-one engineers; two constructors; twenty-one cadets and cadet engineers; 1,648 warrant and petty officers and seamen.

The officers are commissioned by the President with the approval of the Senate and have the same allowances and pay as the army officers of corresponding rank. The captain commandant is the highest officer and is under the orders of the Secretary of the Treasury (except in war time). Cadets are required to complete a three-years' course of training in the Revenue Cutter Academy at New London, Conn., after which they are commissioned as third lieutenants. Men are promoted only after passing rigid mental and physical examinations. Cadet engineers are required to serve a probationary period of one year at the New London Academy. Strict naval discipline and routine are maintained and the ships are kept in readiness for long voyages necessary in the performance of any duty. E.B.P.

REVERE, Mass., *re veer',* a very popular summer resort on the Massachusetts coast, much frequented for its beautiful beach of white sand. The beach may justly be called the "Coney Island of Boston," as great throngs are attracted to this spot from that city, especially on Sundays, when the number sometimes exceeds sixty thousand. Revere is situated in Suffolk County, five miles northeast of Boston and five miles southwest of Lynn. The Boston & Maine provides railroad transportation, and it also has interurban lines. The population increased from 18,219 in 1910 to 28,823 (a gain of 59 per cent) in 1920. The area is nearly six square miles.

Revere is one of the most attractive suburbs of Boston. Through the city extends a beautiful boulevard, which is one of the links of a boulevard system that connects many cities and towns in the state. Revere Town Hall, a memorial to Paul Revere, the Carnegie Library, the $80,000 State Bath House, built and maintained by the state, and a salt-water winter natatorium are features of especial interest. Along the beach there are all the attractions of a large, up-to-date amusement resort. The first settlement on this site was made as early as 1627, when the place was known as Rumney Marsh. It was a part of Boston until 1738. In 1739 it was incorporated as Chelsea, and in 1846 as North Chelsea. The name was changed to its present one in 1871 in honor of Paul Revere. In 1915 the town was chartered as a city.

REVERE, *re veer',* Paul (1735-1818), an American patriot and a hero to every American boy because of the part he played in the events which ushered in the Revolutionary War. He was born in Boston, was educated as an engraver, and had the honor of engraving and printing the first paper currency of Massachusetts. He was one of the leaders in the "Boston Tea Party" (which see) and became a member of the Boston League which pledged itself to watch every British move. In April, 1775, the British commander, General Gage, sent out a force of 800 troops with orders to destroy the American military stores at Concord, about twenty miles from Boston. They were also to stop at Lexington for the purpose of arresting the "archrebels," Samuel Adams and John Hancock. To circumvent the British general, Revere made a famous ride which inspired one of the most stirring poems in American literature, *Paul Revere's Ride,* by Longfellow. The plan of Gage was suspected by General Joseph Warren, whose messenger Revere was, and it was decided that the latter should mount his swift horse, ride ahead of the enemy to Lexington, and warn the people along the way. Accordingly, on the eighteenth of April, Revere—

> Said to his friend, "If the British march
> By land or sea from the town to-night,
> Hang a lantern aloft in the belfry arch
> Of the North Church tower as a signal light—
> One if by land and two if by sea;
> And I on the opposite shore shall be,
> Ready to ride and spread the alarm
> Through every Middlesex village and farm,
> For the country-folk to be up and to arm."

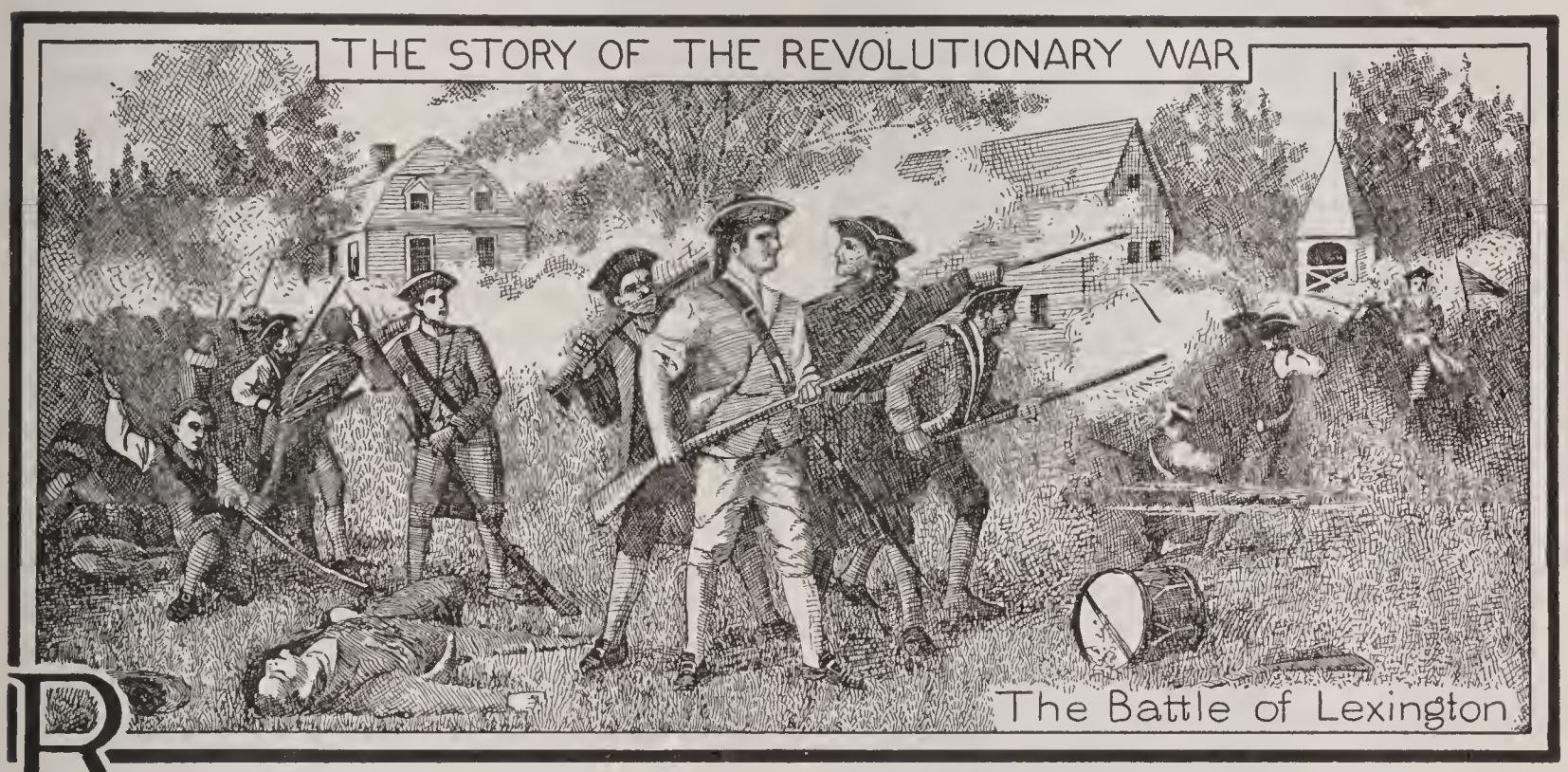
And upon the appearance of Warren's signal there was instant mounting and hard riding until dawn.

So the countryside was roused and Gage's purpose was defeated. On his way to warn Concord, Revere was captured by the British, but was soon released. He died in Boston in 1818. The house in which he lived there is yet standing (see illustration, page 847).

REVOLUTION, *rev o lu' shun,* the name given to a political movement, either military or civil, but nearly always accompanied by warfare, with the object in view the overthrow of existing government or to force reforms.

A revolution may be external or internal. An *external* revolution occurs when a part of a state separates itself from the remainder and declares itself an independent state; the American Revolutionary War was of this kind. An *internal* revolution occurs when a nation as a whole repudiates its existing political organization and changes its form of government; the republic of France rising from the ruins of the Empire is an instance, as is also the Russian overthrow of its monarchy in 1917. When an internal revolution simply destroys an existing organization without definite plans for a substitute, the action is called *anarchical;* if the aim is to establish a new form of government, it is called *constitutional;* if the avowed intention is to change some governmental measure or to change the personnel of the government, it is a *governmental revolution.* If a revolution succeeds in establishing a new and better government those who participated are recorded in history as patriots; if it fails, the leaders are punished as traitors. Posterity, however, can usually judge to which of these classes revolutionists rightly belong.

In these volumes, under the countries named, will be found the stories of the world's principal revolutions, namely, American (1775-1783); French (1789-1799); Chinese (1912-1917); Mexican (1910-1916); Russian (1917). The reader is referred to them.



REVOLU'TIONARY WAR IN AMERICA. At the conclusion of peace in 1763, following the French and Indian wars, Great Britain was possessed of the greater part of the North American continent. It owned all the territory from the Arctic Ocean to Florida and west to the Mississippi River, while in Canada its wilderness empire stretched to the Pacific Ocean, although a part of the area was claimed by Spain. Except along the Atlantic coast it was almost entirely a red man's land, but a fringe of prosperous colonies lined the seaboard, and settlements of hardy pioneers dotted the area west to the great river.

The English government had no settled policy to apply to its loyal, growing and ambitious colonies. In later times and in other severe crises it has, to use a phrase of its statesmen, "muddled through"; but in dealing with its American colonies it met its one great defeat. Out of that defeat there developed a viewpoint so sane and an administrative policy so wise that Britain's possessions now encircle the globe, and millions of contented subjects thousands of miles distant from the mother country proclaim unswerving loyalty to the British flag. The responsible rulers of the Empire accepted the lesson of their grave errors and were careful never to repeat the mistakes that had proved so costly.

The loss of the colonies in America through the Revolutionary War left a feeling of bitterness which survived for generations, but with the spread of democracy in the world there has come a better understanding. In 1917 Foreign Minister Balfour of the British Cabinet laid a wreath on the tomb of George Washington at Mount Vernon and proclaimed him a patriot.

Causes of the War

In 1763 King George III issued a proclamation decreeing that the land between the Alleghany Mountains and the Mississippi River should be reserved for the Indians. He desired to limit colonization to the coast area, to make control by Great Britain an easy matter. The French and Indian wars had cost England about $350,000,000; the king insisted that the American colonies, through taxation, should be forced to pay a part of that sum, notwithstanding the fact that they had plunged into debt to the extent of $130,000,000 in behalf of the mother country. Edmund Burke (which see) said in Parliament that this demand was the origin of the quarrel between the home government and the colonies.

Moreover, the English government proposed to maintain a standing army of 10,000 men in America, the king declaring it necessary for the purpose of holding the conquered French Canadians in subjection and to protect the colonists from the Indians. The colonists were to be asked to meet this expense by stamp taxes, but they protested against the burden on the ground that they were strong enough to protect themselves from the Indians and that they had no direct interest in Canadian affairs.

The British Prime Minister, Lord Grenville, held the very unpopular view that English colonies were merely places of trade, and that they existed only for the benefit of Great Britain. Many great Englishmen denounced such a "shopkeeper's policy," but the king and his advisers determined to maintain the principle. The colonies loyally admitted the home government's right to levy export and import taxes, but they insisted that local industry was not to be taxed at will. Moreover, the colonies demanded representation in Parliament, that their voice might be heard, if a taxing policy were insisted upon. The rallying cry, "Taxation without representation is tyranny," was taken up with enthusiasm in every colony.

AFTER THE YEAR 1763

(*a*) English possessions; (*b*) claimed by Spain and England; (*c*) Spanish possessions.

The Stamp Act. Possibly the manifold evidences of loyalty emboldened the king to adopt measures which otherwise he would have hesitated to enforce. As late as 1768 Samuel Adams of Massachusetts expressed the general feeling that "nothing but unkind usage could sever the ties which bound America to England." However this may have been, the king ordered his American officials to search in the colonies for smuggled goods, under questionable authority of his Writs of Assistance. In 1765 the Stamp Act was passed. This was extremely objectionable and threatened a very serious burden. Its plan of operation was very similar to that of present-day internal revenue laws; the colonists might evade some of Britain's taxing schemes, but there could be no escape from a system which made it necessary to affix stamps, valued from a halfpenny to fifty dollars (£10), upon all legal papers, insurance policies, newspapers and advertising sheets. A year was to elapse before the act was to be effective. Parliament debated the question heatedly. Burke spoke in favor of the colonies; William Pitt also denounced the measure.

When news of the passage of the act reached America denunciation was bitter. The temper of the people was recorded in a Stamp Act Congress which met in 1765 in New York, with delegations from nine colonies. It affirmed that—

> * * * the people of these colonies are not, and from their local circumstances cannot be, represented in the House of Commons in Great Britain, * * * * and that no taxes ever have been, or ever can be, constitutionally imposed on them except by their respective legislatures.

Merchants threatened not to buy English goods as long as the act was in force. So-called "Sons of Liberty" plundered official stores and burned the obnoxious stamps and forced officers to agree to abide by the will of the people. The resistance of America frightened the king and his ministers, and the Stamp Act was repealed in 1766.

The Townshend Act. In the following year the Townshend Revenue Act was aimed at the colonies. It provided that the colonists should pay the salaries of the governors, vice-governors and judges sent by the king; in the choice of these the people affected had no voice, and they could not control their numbers. The act also legalized the Writs of Assistance, which had been previously declared unlawful. The colonies again threatened to boycott England's merchants, and the protest sent to England was

effective in securing the repeal of the Townshend Act, excepting the provision relating to a tax upon tea. This was retained to impress the colonists with the mother country's right to levy taxes.

Quartering Act and Boston Massacre. In 1766 England imposed upon the people of the colonies the duty of providing for the king's soldiers, each locality to care for the troops there quartered. In 1768 Boston was forced to receive several regiments, in spite of its protests. Two years later (1770) a mob of citizens, some of them probably of the irresponsible sort, not able longer to endure the affront to loyal English subjects, attacked the soldiers with clubs and other missiles and dared them to fire. What is known as the Boston Massacre resulted. The troops fired, killing and wounding several persons. Crispus Attucks, a negro, was the first man to fall in the Revolutionary cause.

Committees of Correspondence. Alarmed at the constantly increasing tension between Colonials and the English authorities and fearing further trouble Boston organized a Committee of Correspondence "to state the rights of the colonists * * * to the several towns and to the world." The movement was so popular that soon every village in Massachusetts possessed a similar committee, and by the spring of 1773 there were intercolonial committees which enabled all the colonies to work in harmony. See COMMITTEES OF CORRESPONDENCE.

The Boston Tea Party and Its Results. When the Townshend Act was repealed by Parliament a tax on tea was retained, to emphasize the royal right to impose taxation. The manner in which Boston disposed of the troublesome question is related in the article BOSTON TEA PARTY (page 852). In 1774 the ruling power in England further inflamed the passions of colonists by the passage of five obnoxious laws in retaliation for the lawless "tea party" (see INTOLERABLE ACTS).

There seemed no longer a possibility of existence without organized effort to abate the evils which had been multiplying. A congress of the colonies, known as the First Continental Congress, met in Philadelphia in 1774 and adopted a "Declaration of Colonial Rights." It declared that the colonies only had the right to enact local laws and to levy taxes; that the people were entitled to protection of the common law of England and to trial by jury instead of deportation to England for trial; that the severe laws passed by Parliament were threatening their loyalty to the Crown. The Declaration asked that the king, "as the loving father * * * of his whole people," lessen their wrongs. When the document reached Parliament Burke's voice was again heard in a speech which came to be known as the remarkable "On Conciliation with America."

STONE CANNON MEMORIAL AT LEXINGTON

The inscription is as follows: "Near this spot Earl Percy, with reënforcements, planted a field piece to cover the retreat of the British troops, April 19, 1775."

Pitt was now Prime Minister; he, too, pleaded the cause of the colonies, but without avail. Further measures cut off the colonies from foreign trade and threatened the destruction of New Englanders by cutting off their fishing privileges in Newfoundland waters.

Lexington and Concord. The colonists began to prepare for armed resistance. They were stirred by Patrick Henry's—

> Is life so dear or peace so sweet as to be purchased at the price of chains and slavery?

and throughout the narrow ribbon of colonies there were hurried preparations. General Gage, English commander in Boston, attempted to seize some cannon in Salem, but failed. He heard of military stores which had been secreted at Concord, twenty miles away, and sent 800 men to take them. Paul Revere, by arrangement, rode all night of April 18, 1775, spreading the alarm:

> "A hurry of hoofs in a village street,
> A shape in the moonlight, a bulk in the dark,

And beneath, from the pebbles, in passing, a spark
Struck out by a steed flying fearless and fleet;
That was all! And yet, through the gloom and the light,
The fate of a nation was riding that night;
And the spark struck out by that steed, in his flight,
Kindled a land into flame with its heat."

On the morning of April 19 the British regulars faced seventy men under Captain John Parker at Lexington. "Don't fire first," Parker said, "but if they want war let it begin here." In the ensuing volley seven Americans were killed. Pitcairn withdrew, and, hurrying on to Concord, destroyed all the stores he could find. On his return to Boston the enraged farmers gathered in such force as was possible and harassed his troops the entire length of the route.

Proclamations. General Gage in Boston received additional British troops under Burgoyne, Clinton and Howe, to cope with the insurrection. In June, 1775, he issued a public letter threatening death by hanging to all rebels who continued to resist the king's officers. He offered pardon to all who would "at once lay down their arms, excepting only Samuel Adams and John Hancock."

On the fifteenth of the same month Congress appointed George Washington commander-in-chief "of all the Continental forces raised, or to be raised, for the defense of American liberty."

Events to July 4, 1776. Both sides prepared hurriedly for such events as might be forced upon them. While Congress was equipping the American forces Gage decided to strengthen his position by seizing Bunker Hill, a height near Boston. The Americans were ahead of him, and he was forced to give them battle. Lexington, Concord and Bunker Hill convinced the Americans that war was inevitable, that allegiance to the king was no longer possible and that independence must be achieved, if possible, by force of arms.

On July 4, 1776, Congress issued to the world the reasons why "these united Colonies are, and of right ought to be, free and independent states." This Declaration of Independence was signed by fifty-six delegates from the thirteen new states which the action of Congress thus created. John Hancock was the first signer.

THE WASHINGTON ELM

This tree is still standing in Cambridge, Mass. On the tablet shown in the illustration are the words:

"Under this tree Washington
took the command of the
American Army, July 3, 1775."

Eight Years of War

Three Periods. It is convenient to divide the Revolutionary War into three periods. The first ends with the Declaration of Independence. From that day a new purpose actuated the colonies, for they had announced their freedom and knew they would have to unsheath the sword to secure it. The troubled years through which the colonies had just passed had witnessed sincere efforts to avert a breach. Patrick Henry summarized those years when he said:

We have done everything that could be done to avert the storm which is now coming on. We have petitioned; we have remonstrated; we have supplicated; we have prostrated ourselves before the throne, and have implored its intercession to arrest the tyrannical hands of the Ministry and Parliament.

The days of uncertainty were ended; the Continental Congress and the people faced the future with stern resolution. George Washington had been summoned to the command of the American forces a year before, as a precautionary measure, but the army was a motley array which showed little strength. Washington and his aides never had a large army; it

averaged each year about 31,500 men, but at the lowest ebb in the tide of the new nation's fortunes it was not greatly in excess of 3,000 men. Until July, 1776, the army's flag was the British field, with thirteen stripes to represent the colonies. The new American flag, credited to the designing skill of George Washington, Robert Morris and Mrs. Betsy Ross, soon flew in evidence of the political separation from the mother country.

During the first period of the war an expedition was sent to capture Quebec, intrusted to the leadership of Montgomery and Arnold. On December 31, 1775, they assaulted the city; Montgomery was killed, Arnold had his leg fractured, and the attack failed. Before the summer of 1776 the American forces were driven south to Lake Champlain. While this drama was being enacted Washington drove the British out of Boston; they embarked for Halifax, from which point they returned later to take part in the campaign around New York.

Second Period. This division of the war covers the time from the Declaration of Independence to the entrance of France into the struggle, in May, 1778. Two sections of the country were principal centers of activity during these two years. New York City and vicinity witnessed changing fortunes of war, and Philadelphia was the center of the campaign farther south.

When Howe evacuated Boston and went to Halifax he remained there only long enough to learn the British plans. Soon his troops were reëmbarked and set sail for New York. Washington realized the importance of holding that city, for if it fell to the enemy the British would control the Hudson River and might be able to cut off New England from the remainder of the country. Howe encamped on Staten Island, now the Borough of Richmond (see page 4205), and planned his operations. When ready, he captured Brooklyn Heights, in an engagement known as the Battle of Long Island. This was the key to New York's defense and the British victory forced the hurried evacuation of the city, in September, 1776.

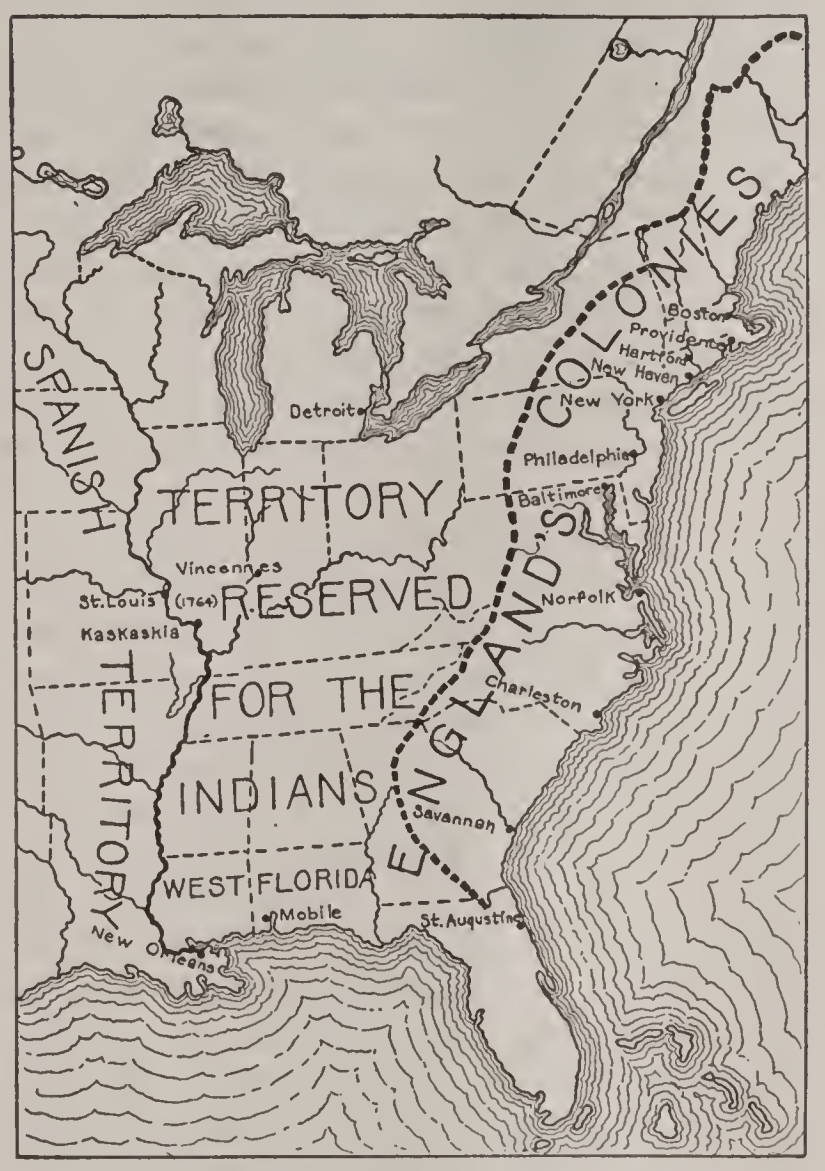
Washington crossed the Hudson and was steadily pursued southward through New Jersey, losing ground continually in the face of overwhelming numbers of his pursuers. Forts Washington and Lee were lost, and in November began one of the most famous and most masterly retreats in all history. Washington's only hope lay apparently in his ability to cross the Delaware and get to Philadelphia, otherwise his entire army might be captured. Sometimes the pursuers were so close that when they entered a town the pursued were just leaving it. By destroying bridges and leaving obstructions in the way Washington got to Trenton ahead of his enemy, on December 8. Seizing every boat for miles up and down the river he embarked his men, and the British, coming up, saw the last boatloads push out from shore.

Cornwallis, who commanded this chase, went into quarters at Trenton and at Princeton until he could build boats enough to put his army across to take Philadelphia. He did not anticipate attack, but on Christmas night, 1776, Washington recrossed the river and in the morning surprised the enemy in a spirited attack. The Battle of Trenton was an audacious undertaking; the effect was as great as though it had been a victory won in a struggle on a vast scale, for it was the first ray of hope the country had received from its armies. The long retreat had discouraged the people and had almost bred treason in the army. Cornwallis planned to hurl his forces upon Washington before the latter could get across the river again, but he lacked the proper initiative. Thinking he had Washington trapped on the night of January 2, he could afford to wait until morning and make an easy capture. The Americans, however, did not sleep that night. Hurrying inland, they surprised the garrison Cornwallis had left at Princeton under command of Rahl, at daybreak on January 3, and completely routed the entire British line. These two victories destroyed the British line of campaign and gave new courage to the Americans. Frederick the Great, Europe's greatest warrior, characterized the ten days' movement as the most brilliant in the history of warfare.

Howe left New York to march across New Jersey to capture Philadelphia; the Continental army, small but energetic, placed every conceivable obstacle in the way, and after several weeks spent in a vain effort to achieve his object he returned to Staten Island. His next attempt to reach Philadelphia was by sea, but obstructions had been placed in the Delaware River, and his troops landed sixty miles from the city. The march towards Philadelphia was made difficult, but this time Howe was successful. He defeated the Continentals at Brandywine (September 11, 1777) and at Germantown (now a part of Philadelphia) three weeks later. Washington retired to Valley Forge for the winter, and the victorious Howe

entered Philadelphia. At Valley Forge the Continental army endured incredible hardship because of a lack of even the barest necessities.

A Decisive Battle. The British soon began a new line of attack in the north. Burgoyne was ordered to descend from Canada to take Ticonderoga; another force, also from Canada,



AT THE BEGINNING OF THE WAR.

was to march on Albany. The two were to join and meet a force sent by Howe, from New York. Howe received his instructions too late, and was not a factor in the actions fought in September and October. In brief space of time Oriskany, Fort Stanwix, Bemis' Heights and Saratoga told of the Continental army's determined resistance. Saratoga ended the campaign, for Burgoyne's army was captured. Creasy in his *Fifteen Decisive Battles of the World* calls Saratoga one of the few conflicts which have determined great issues; it was the turning point of the war, for France was convinced then that its aid should be extended to the struggling republic. Accordingly, an army and fleet were dispatched from France, and thereafter the French had an important part in the struggle. Lafayette was an inspiring leader who rendered invaluable service to the cause.

Third Period. England was alarmed at the turn of affairs. Plans in the north had miscarried, by the surrender of Burgoyne; the brilliant turning upon the victorious British at Trenton and at Princeton had upset the campaign around Philadelphia; British officers reported to London that the colonies could not be conquered; the French alliance promised such formidable reënforcements that the task of England took on a most serious aspect.

Early in 1778 an English commission was empowered to treat for peace. The colonies were promised everything they had begged for in the years before, but every offer was rejected, and the war was pushed with new vigor and added enthusiasm. There were discouraging circumstances, however; the most serious internal trouble of the year was a plot, inspired by Conway, inspector-general of the army, for the overthrow of Washington, who was to be succeeded by Gates, the winner of the Battle of Saratoga. The plan was discovered, and it came to naught. Baron Steuben was advanced to Conway's post; he exhibited the trait of German thoroughness and made good soldiers out of the men who were offering themselves to the cause.

Sir Henry Clinton succeeded Howe in the Spring of 1778. Knowing that the French fleet was coming and fearing a blockade of Philadelphia he evacuated that city and started to move his forces overland to New York. Washington followed and forced a battle at Monmouth (June 28). It was here that Lee was disgraced for his attempt to avoid a fight; Washington ordered him to the rear, rallied the wavering regiments and defeated the British. Monmouth was the last battle of importance in the north.

The Northwest. George III had decreed that the country between the Alleghany Mountains and the Mississippi River should be reserved for the Indians. The British held authority over the vast area by their forts at Detroit, Vincennes, Kaskaskia and Cahokia. In 1778 George Rogers Clark undertook the task of winning the territory for the new nation which was slowly but surely making itself effective in the east. He had no authority except that of Patrick Henry, then governor of Virginia, who helped him to muster a group of hardy pioneers. Clark first took Kaskaskia, and in turn Cahokia and Vincennes. The British recaptured the latter, and Clark had to retake it (February, 1779). Only Detroit remained in English hands.

Naval Victories. In 1777 citizens of Portsmouth, N. H., built a small boat, the *Ranger,*

which was turned over to privateering, under command of John Paul Jones. He added two other small vessels, and with this American "navy" he captured two British men-of-war so close to the English shore that thousands of people witnessed the battle.

Arnold's Treason. For ability and conspicuous service Benedict Arnold had been commissioned senior major-general of the Continental army. In 1779, while in command in Philadelphia, he was accused of irregularity and fraudulent dealings. A court-martial, called at his own request, gave him a no more severe sentence than a reprimand from Washington, which was delivered in all kindness.

During the summer of 1780 he asked for and was given the post of commandant at West Point. He was bitter towards the cause of the states, because of the Philadelphia experience, and the appointment was sought that he might secure revenge. He purposed to turn West Point over to the British. The plot was discovered; Major Andre, the English messenger in the undertaking, was caught and executed as a spy. Arnold escaped, and accepted a commission in the English army. He died twenty years later in London, without the respect of the English and despised in his native land.

Campaigns in the South. There were many more loyalists in the South than in the North, and the British hoped to win them actively to their cause by a demonstration in force. Therefore, English effort was transferred very largely to the South in 1778. Savannah was taken December 29, and Augusta fell soon afterwards. In May, 1779, after a siege of six weeks, Charleston was taken. Feeling secure in possession, Cornwallis, then in command, warned the people to return to their former allegiance, threatening them with the fate of traitors if they refused. Local warfare between patriots and loyalists occupied many months. Gates was sent south to cope with the situation, and before his troops were prepared the Battle of Camden was fought. Camden was a British victory, and it ended Gates' military career.

The next serious effort in the South was an expedition sent by Cornwallis to intercept a retreat of Americans into North Carolina. A battle at King's Mountain, fiercely contested, was won by the Continentals, and it marked the turning point in the war in that section. Greene was sent to succeed Gates, and he had for aids Morgan and Marion. The British ordered Tarleton to punish the Americans for their victory at King's Mountain. The forces met at Cowpens, and Tarleton's defeat was so complete that he lost two-thirds of his men. The next engagement was at Guilford Courthouse; it was a British victory dearly bought, for it cost so many men he could not continue the offensive. The campaign in the South ended with the Battle of Eutaw Springs; it was an undecided engagement, but the Continentals were left in possession of the field, and the British retired to Charleston.

Cornwallis, who had returned north to rearrange his campaign, started south with a new force to offer aid to his armies there. The French fleet entered Chesapeake Bay, effected a juncture with Washington, who had marched from the North, and the two forces engaged Cornwallis at Yorktown. From September 4 to October 17, 1781, they besieged the British; on the latter date the English surrendered. The Britons knew the war was practically over, but fighting continued on an unimportant scale for several months. A provisional treaty of peace was signed before the close of 1782, and on April 19, 1783, exactly eight years after the Battle of Lexington, Washington issued an order declaring the war at an end.

The Treaty of Peace. The commission to agree upon terms of peace met at Paris, where on September 3, 1783, the final treaty was signed. The points secured in favor of the new nation were these:

(1) Recognition of the complete independence of the thirteen states.

(2) Location of the western boundary at the Mississippi River.

(3) Permission granted to New England fishermen to fish in Newfoundland waters.

The American members of the peace commission were John Adams, Benjamin Franklin and John Jay. E.D.F.

Consult Fisher's *True History of the American Revolution;* Marks' *England and America, 1763 to 1783;* Howard's *Preliminaries of the Revolution.*

Related Subjects. The following articles in these volumes may be read in connection with this discussion of the Revolutionary War:

HISTORICAL ARTICLES

Bennington
Boston Massacre
Boston Port Bill
Boston Tea Party
Brandywine, Battle of
Bunker Hill, Battle of
Cabal, subhead *Conway Cabal*
Committees of Correspondence
Concord, Mass.
Declaration of Independence
Flag, subtitle *United States Flag*
Germantown, Battle of
Green Mountain Boys
Guilford, Battle of
Hessians
Intolerable Acts
Lexington, Battle of
Monmouth, Battle of
Paris, Treaties of
Princeton, Battle of
Saratoga, Battles of
Stamp Act

Ticonderoga, Battles of
Trenton, Battle of
Valley Forge
White Plains, N. Y.
Writ of Assistance
Yorktown, Sieges of

BIOGRAPHIES

Adams, Samuel
Allen, Ethan
Andre, John
Arnold, Benedict
Burgoyne, John
Carleton, Sir Guy
Clark, George Rogers
Clinton, George
Clinton, Sir Henry
Cornwallis, Charles
De Kalb, Johann, Baron
Franklin, Benjamin
Gage, Thomas
Gates, Horatio
Greene, Nathanael
Hale, Nathan
Hancock, John
Henry, Patrick
Howe, subheads *Richard* and *Sir William*
Jones, John Paul
Lafayette, Marquis de
Lee, Charles
Lee, Henry
Lee, Richard Henry
Marion, Francis
Otis, James
Pickens, Andrew
Putnam, Israel
Revere, Paul
Ross, Betsy
Stark, John
Steuben, Baron von
Warren, Joseph
Washington, George
Wayne, Anthony

REVOLV'ER, a firearm which is at once a benefit to mankind and a menace to the peaceful citizen, was the invention of Samuel Colt. It contains a revolving cylinder with five or six chambers for cartridges, immediately behind the barrel. Each chamber is brought automatically into line with the barrel by the pulling of the trigger, all the bullets being discharged through the one barrel. Many improvements in the mechanism of the revolver have been effected since the early models were made; the most perfect model is the so-called automatic pistol, which is hammerless and fires its cartridges from chambers with great rapidity, requiring only a continued pressure upon the trigger. In the War of the Nations the type of revolver used by officers and cavalrymen was the automatic, or magazine pistol, which proved wonderfully effective.

In most civilized countries the carrying of a revolver by unauthorized persons is a criminal offense. The irresponsible person, who may be defined as one whose personal views, too often criminal, are held superior to the mandates of humanity and law, would be less a social danger if deprived of a revolver. Persons authorized to carry firearms include soldiers, policemen and others whose duty it is to protect life and property. The police of most cities and all peace officers in the discharge of their duties are permitted to arm themselves with revolvers, or such pistols as meet with official approval. English policemen are at all times entirely unarmed, save for a baton, or club.

Revolvers are made in many sizes and vary greatly in price, ranging from $2 up to $100 or more in case of specially ornamented weapons. Metal cartridges with steel-jacketed bullets are used in the higher grade of weapons, superseding the softer-headed bullets in cheap cartridges.

REXFORD, Eben Eugene (1848-1916), an American poet and writer on gardening subjects, best known as the author of *Silver Threads Among the Gold.* This ballad has been set to music and has won international popularity. Rexford was an authority on horticulture and floriculture, and during his later years he was the editor of the "Gardening" column in the Chicago *Tribune.* He began writing for the press at the age of fourteen and has contributed poems and articles to nearly every magazine published in the United States. Although born in Johnsburgh, N. Y., he is claimed by Wisconsin, as that state was his home from boyhood, and he was a graduate of Lawrence University, at Appleton. He was prominent in social and philanthropic work, and for twenty-five years was organist in the Congregational Church in Shiocton, Wis. Among his works are two volumes of verse: *Brother and Lover,* containing poems of the war; and *Pansies and Rosemary.* Other titles include *Home Floriculture; Grandmother's Garden; Flowers—How to Grow Them; Four Seasons in a Garden; The Home Garden; The Indoor Garden; Amateur Garden Craft.*

REYKJAVIK, REIKJAVIK or **REIKIAVIK,** *ra kyah veek',* the capital of Iceland, is situated on its southwest coast, at the head of Faxa Fiord. The town has professional, elementary and secondary schools, an observatory, a library and a university. The minister to Iceland, appointed by the Danish king, lives in Reykjavik. Iceland has had home rule since 1874, and the Althing, or Parliament, meets at its capital. Most of the year the port is icebound, but in summer a steamship line to Copenhagen operates. The population is about 12,000. See Iceland.

REYNOLDS, *ren'ulds,* Sir Joshua (1723-1792), one of England's masters of portrait painting, sometimes called the "Van Dyck of the Eighteenth Century." It is said that he painted between two thousand and three thousand portraits; among his patrons were beautiful women of society and men prominent in art, literature and politics. He had the gift for conveying to the canvas the individuality of his subject, and so his portraits are wonderfully lifelike, though the drawing is often faulty. He was a master of color, but his fondness for experimenting in this field had unfortunate re-

sults, for many of his best works are badly faded.

Reynolds was the son of a rector and schoolmaster of Plympton, Devonshire. At the age of eighteen he began studying with a prominent portrait painter, and two years later started on an independent career. A sojourn of three years in Italy, the land of art, proved of great value to the talented young man, and by 1752 his reputation was firmly established. In 1768 he was elected first president of the Royal Academy, was knighted by King George III, and in 1784 became painter to the king. Reynolds was an intimate friend of Johnson, Goldsmith, Garrick and other literary men, and was associated with them in the celebrated Literary Club.

The National Gallery of London possesses a number of the best of Reynolds' canvases, including portraits of Goldsmith, Dr. Johnson, Garrick and Admiral Keppel. Three portraits of himself are also in this collection. *Mrs. Siddons as the Tragic Muse,* the *Duchess of Devonshire* and many other famous pictures are in smaller galleries or private collections. In America many fine examples of his work are housed in the Metropolitan Museum, in the New York Public Library and in several private collections. Reynolds wrote an admirable series of treatises on the history of art, which are collected under the title *Discourses before the Royal Academy.*

RHADAMANTHUS, *rad a man' thus,* in Greek mythology, a son of Jupiter and Europa. By his inflexible integrity Rhadamanthus aroused the jealousy of his brother Minos, while the latter was king of Crete, and was forced to flee from the country. After his death Rhadamanthus and his brothers, Minos and Aeacus, ruled as judges of the lower world. It was their duty to question all newly-arrived souls, to sort out the good thoughts and actions from the bad, and to place them in the scales of Themis, the goddess of justice. If the good outweighed the evil the spirit went to the Elysian Fields; if evil prevailed, the spirit suffered in the fires of Tartarus.

RHEA, *re' a,* a large bird which is popularly called the "South American ostrich," because of its similarity to the ostrich. Scientists note so many points of difference, however, that in recent years they are inclined to place the two in distinct families, calling the rheas *Rheidae (re' i de).* The ostrich has two toes, without claws; the rhea three, with claws. The rhea's head and neck are not so bare of feathers; it has wings, which are, however, very small. and of no value for flight. Finally, this bird is only about half the size of the ostrich, for it stands not more than three feet in height.

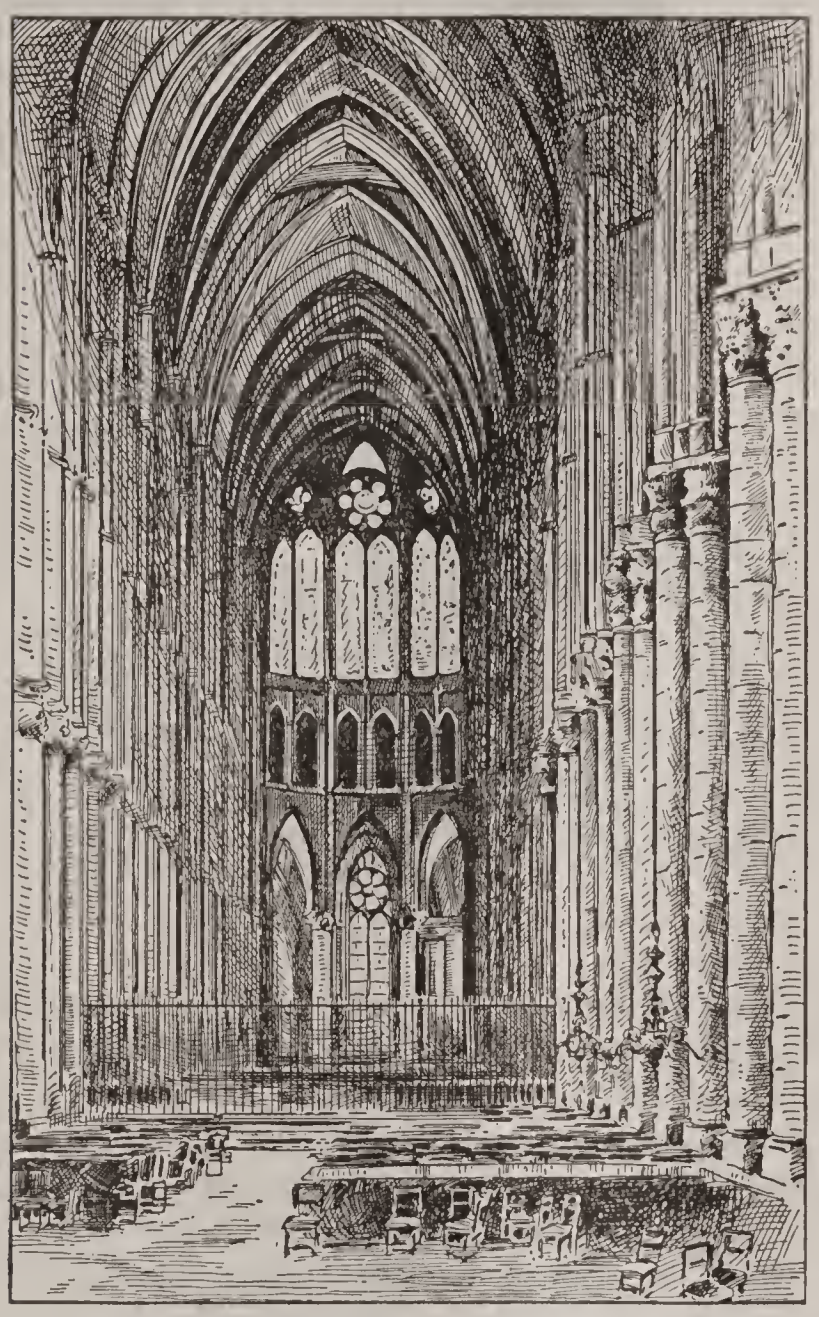
The rhea is not found north of the equator, but is numerous in the plains of Southern Brazil, Uruguay, Paraguay and Northern Argentina. It is of some commercial importance; its plumes, much inferior to ostrich plumes, are made into brushes, and its skin is manufactured into a native rug. Rheas are polygamists; one male appropriates two or more females; the latter lay their eggs in the same nest, and when the number reaches twenty to twenty-five the male assumes the task of hatching them. The birds live in communities of a dozen to twenty, and eat worms, snails, berries, seeds—anything small in the animal and vegetable kingdoms. The local name of the rhea is nandu *(nan' doo).*

THE RHEA

RHEA, in classic mythology, a goddess who was the symbol of the productiveness of nature. She was often given the name of "Mother of the Gods." Rhea was the daughter of Uranus and Gaea, or Heaven and Earth, the sister and wife of Saturn, the mother of Pluto, Jupiter, Neptune, Juno, Vesta and Ceres. In Phrygia, a division of Asia Minor, Rhea was identified with Cybele, who presided over mountain fastnesses and fortified places. She was attended by priests called Curetes, and her chariot was driven by lions. Rhea cured Bacchus of madness, taught him her religious rites, then sent him forth to teach the cultivation of the vine.

RHEIMS, or **REIMS,** *reemz,* a fortified city of Northern France, whose magnificent thir-

teenth century cathedral made it a place of interest to all lovers of art. This great edifice, one of the most beautiful examples of Gothic architecture ever built, was injured beyond all possibility of repair during the War of the Nations. Up to the armistice nearly 750 shells had hit the building. (A picture of the exterior, accompanying the article CATHEDRAL, will be found in these volumes on page 1228.)



NAVE OF RHEIMS CATHEDRAL

This great cathedral, one of the most beautiful in the world, was slightly damaged in 1915 in the War of the Nations; more serious bombardment in 1917 threatened its total ruin. It escaped destruction, but at the end of the war was very badly damaged. In 1919 it was proposed to make the building a memorial to the French who died in the service of their country.

The attempt to destroy the cathedral was one of the most cruel blows that could be struck at the French. For 650 years nearly all the kings of France were crowned in it, and here Joan of Arc stood at the coronation of Charles VII, in 1429.

Rheims, the center of a great vine region, is on the Vesle River, ninety-eight miles northeast of Paris, and is the capital of the department of Marne. After the Battle of the Marne in September, 1914, the city was not in the territory occupied by the Germans, but the hostile forces could reach it with their great guns, and not a week passed for over three years that it was not bombarded. The extent of the destruction can be imagined from the fact that from June 15 to June 28, 1917, a total of 16,052 shells fell within the city. The town in August of that year was rapidly becoming a shapeless mass.

The population in 1914 was 115,178. In 1917 fewer than 5,000 people remained, but in 1921 the population was 76,645.

RHETORIC, *ret'o rik.* During all his school years, from the primary school to the university, the student is receiving instruction, more or less formal, in the use of his mother tongue. In the early grades he has "language" lessons, through which he learns, half unconsciously, to express himself freely in speech and to set forth some of his thoughts in writing. Then follows grammar, in which the student learns the "why" of many of the things he has been told to say or not to say, and in which increased emphasis is placed on composition, or written exercises.

Further study into this most interesting subject of oral and written expression makes clear the fact that fluent expression or even grammatical expression is not the sole aim. That the words used, the sentence structure chosen, the figures of speech introduced may be such as to convey in the very best possible manner a certain thought—that is the final goal. To teach such a correct method of conveying the thought is the province of rhetoric. Strictly speaking, rhetoric concerns itself merely with *spoken* language, while the closely-related subject, *composition,* deals with written language; for the word *rhetoric* is derived from a Greek word meaning *orator.* But in its commoner sense it includes everything pertaining to the art of communication, whether written or spoken.

To sum up, the person who has mastered rhetorical principles will not use poetic, flowery language in a business letter; he will not use in a simple after-dinner speech the balanced phrases and the dignified, sonorous sentences which might be perfectly in keeping with a formal address on a lofty subject; he will not treat a serious subject in flippant, colloquial style, but he will strive always to make the manner of expression fit the topic, that his hearers and readers may feel in the very words his attitude toward his subject.

Consult Erskine's *Written English;* Baker and Thorndike's *Everyday English;* Baldwin's *College Manual of Rhetoric.*

Related Subjects. The following articles in these volumes may be consulted in connection with this discussion of rhetoric:

Climax
Figure of Speech
Grammar
Language
Metaphor
Metonymy
Personification
Simile

RHEUMATISM, *roo'ma tiz'm,* a term which covers a number of physical disorders characterized by severe inflammation of the joints or muscles. The most painful form is that known as *inflammatory rheumatism, rheumatic fever* or *acute articular rheumatism.* It begins with high fever and headache, extreme tenderness in one or more of the joints and profuse sweating. As the disease progresses the joint or joints attacked become red, hot and swollen, and the victim is doomed to a period of excruciating pain, during which the slightest movements in the diseased parts cause intense suffering. This distressing condition may last for a week or ten days, or it may endure for weeks or months. An attack does not as a rule end fatally; deaths that do occur generally result from inflammation of the heart. There are many authorities who believe that rheumatic fever is caused by a specific germ, but the more generally accepted theory is that it results from poisons produced in the system by diseased tonsils and other infections. One attack predisposes to another, and the disease may become chronic. Persons past middle age who are exposed constantly to cold and dampness sometimes acquire the chronic form, as a result of which their joints become so misshapen as to make them almost helpless.

The term *muscular rheumatism* is applied to inflammation of various muscles. Muscular rheumatism, too, may be acute or chronic, but fever is not usually present, and there are no heart complications. Specific forms are *lumbago,* in which the muscles of the lower part of the back are affected; *intercostal,* which attacks the muscles between the ribs; and *torticollis,* or *stiff neck.* Acute attacks of rheumatism are treated by complete rest in bed, and the application of such hygienic and relief measures as the physician in charge may prescribe. A prominent medical authority (Hutchinson) gives this advice:

> The important single fact for rheumatics of all sorts to remember is that they must avoid exposure to colds, in the sense of infections of all sorts, as they would a pestilence; that they must eat plenty of sound, nourishing food; live in well-ventilated rooms; take plenty of exercise in the open air; dress lightly but warmly, and treat every cold or mild infection which they may be unfortunate enough to catch, according to the strictest rigor of the antiseptic law.

RHINE, *rine,* the stream which might be called Germany's national river, written of by Lord Byron as the—

> wide and winding Rhine,
> Whose breast of waters broadly swells
> Between the banks which bear the vine,
> And hills all rich with blossom'd trees,
> And fields which promise corn and wine,
> And scatter'd cities crowning these,
> Whose far white walls along them shine.

To Germans, the Rhine is the symbol of their national existence and strength. Thus, in Wagner's operas, the possession of the Nibelungen ring, fashioned from the gold guarded by the maidens deep down in the clear Rhine waters, gave to its possessor power over all the world. So, too, in the legends from which Wagner drew his story, the hero Siegfried made himself invulnerable by bathing in the blood of the dragon who had his abode in the Dragon Rock *(Drachenfels),* a hill still pointed out to travelers down the Rhine as they approach the famous university city of Bonn. But the meaning of the Rhine to Germans is best shown in their national anthem, *The Watch on the Rhine:*

> Rest, Fatherland, for sons of thine
> Shall steadfast keep the Wacht am Rhein.

The Rhine in History. The Rhine has figured in German history ever since Caesar built his timber bridge and wrote that description of it which tries the patience of so many boys and girls. For four centuries the Rhine was the boundary between the Romans and the barbarian tribes, except for a short time when the emperor's legions pushed on to the Main. On the west bank grew up Roman cities, Cologne (Colonia Agrippina), Bonn (Bonna), Coblenz (Confluentes), Mainz (Maguntiacum), Worms (Borbetomagus), Speyer (Noviomagus), Strassburg (Argentoratum), all in Germany, and Basel (Basilia) in Switzerland, but the east bank remained thoroughly German.

COURSE OF THE RHINE

In the Middle Ages, the Rhine from Basel to the Netherlands was under German rule, but when France gained a meager foothold on its western shore at the close of the Thirty Years' War, in 1648, a struggle began which has lasted to our own time.

Louis XIV made gains, and Napoleon restored the old Roman boundaries of France. Even after Napoleon's fall, Alsace, which borders the Rhine from Switzerland to beyond Strassburg, was left in French hands, but it was wrested from their grasp in 1870, only to be once more battled over in the War of the Nations. For the fate of the Rhine country in 1919, see VERSAILLES, TREATY OF.

The Course of the River. In the eastern end of Switzerland, close to the Italian border, two glacier-fed mountain torrents start northward. One is the *Vorderrhein,* or Hither-Rhine, the other the *Hinterrhein* or Farther-Rhine. From their union the Rhine hurries along the edge of Austria and the miniature state of Liechtenstein to Lake Constance, which frees it of its mountain mud and sends it westward, tumbling over a fall of seventy feet at Schaffhausen, thence to wind between Baden and Switzerland to Basel, where it turns sharply to the north. It receives tributaries from every Swiss canton except Geneva.

When it turns towards the North Sea the Rhine flows between the Black Forest on the right and the Vosges Mountains on the left. Though it can be navigated at this point its current is so swift that boats use the Rhone-Rhine Canal as far as Strassburg. From Basel the river gradually opens until it is about a half-mile wide, but suddenly plunges into a narrow gorge at the town made famous by Mrs. Norton's poem of the "soldier of the Legion" who was "born at Bingen, fair Bingen on the Rhine." From here to the Dragon's Rock, as in the famous description from *Childe Harold,*

> The river nobly foams and flows,
> The charm of this enchanted ground,
> And all its thousand turns disclose
> Some fresher beauty varying round.

There are peaks crowned with ruined castles, once the strongholds of robber barons who forced their toll from every boat that passed; there is the rock where sat the Lorelei immortalized by Heine, the maiden "of wondrous form and fair," who lured the unwary to destruction with her wild melody; there are dozens of hills around which center legends of Attila the Hun, the heroic Roland and other historic or mythical figures.

To the Netherlands the Rhine spells neither tradition nor present-day inspiration, but only commerce. Entering the Dutch realm, the river is lost in a delta, the main stream of which flows into the Meuse and gives to the ships of Rotterdam the opportunity to steam up to Düsseldorf, Cologne, Coblenz, Mainz, Frankfort-on-the-Main, Mannheim and Strassburg, and to share in the trade of those great cities. Until 1831 the Netherlands took advantage of its control of the Rhine mouths to prevent the shipping of other countries from entering the river. C.H.H.

Consult Mackinder's *The Rhine;* Hugo's *The Rhine;* Clapp's *The Navigable Rhine.*

RHINOCEROS, *ri nos' er os,* a huge, ungainly animal which has a thick, loosely-hanging, almost hairless skin and either one or two broad-based, slightly curved horns projecting upward from its long nose. Its name is made from two Greek words, meaning, literally, *nose-horned.* Next to the elephant and hippopotamus it is the largest animal, an adult weighing from 4,000 to 6,000 pounds. It has an immensely heavy, solid body, clumsy, short legs and a three-toed foot, each toe encased in a separate hoof. It feeds on grass and roots, leafy twigs and shrubs; in captivity, which it endures well, it is very fond of bread, fruits and sweets. The rhinoceros is found to-day in a wild state only in Africa, in Southeastern Asia and on a few large islands near the Asiatic coast, but in ages long past it also roamed over Europe, North America and Northern Asia.

There are five distinct species. The rhinoceros most often seen in parks and in menageries is the Indian rhinoceros. It has one great, blue-black horn, very thick at the base and between one and two feet long. Its skin hangs

THE INDIAN RHINOCEROS
The African type, differing little in other respects, has two horns.

in such definite folds that the huge beast looks as though it were encased in armor plate. It lives among jungles and dense growths of reeds and grass, on which it feeds at night, while by day it frequents the marshy borders of rivers and lakes. The Indian rhinoceros was well-

known to the ancients of Oriental countries and was even used in the games of the circus in Rome before the time of Christ, but later it was so completely lost to the European world that it was believed to be extinct. When the Portuguese discovered the ocean route to India in the fifteenth century this animal was rediscovered, and a present of one was sent to the king of Portugal by an Eastern prince in 1513.

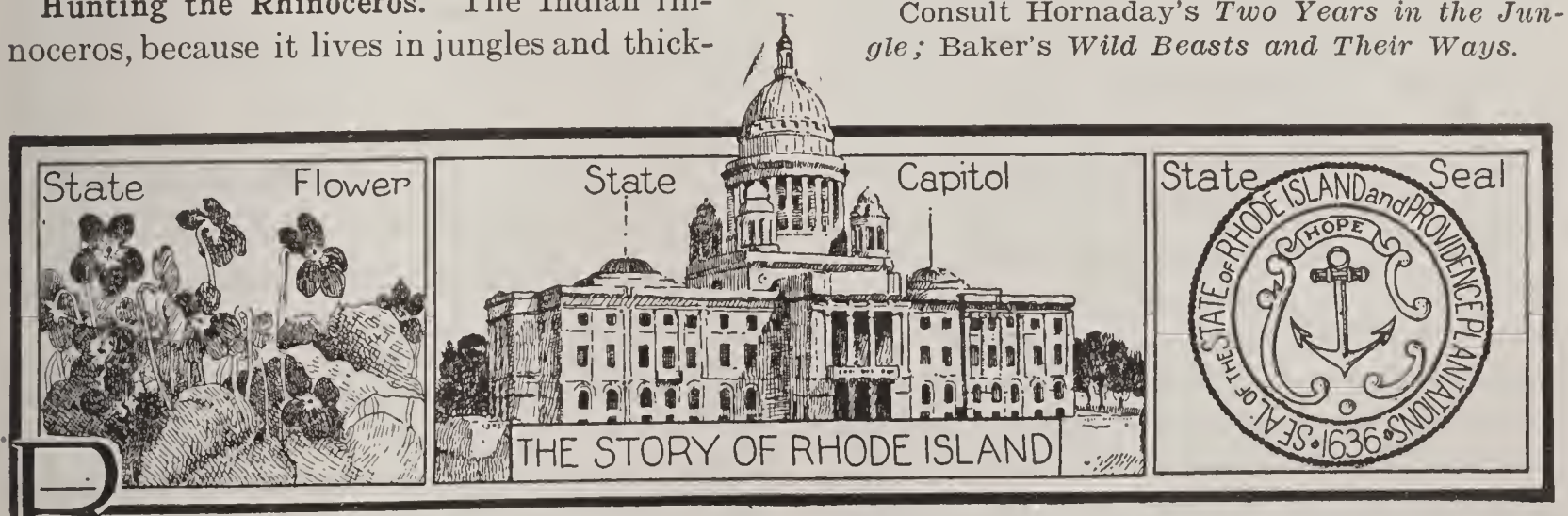
Almost up to the present time it was believed that any article made from the horns had magic properties; that a cup of rhinoceros horn, for instance, would fall to pieces if poison were poured into it. Specimens of the Indian rhinoceros have become so rare that they are now protected by law. There is a similar but smaller rhinoceros native to Southern India, the Malay peninsula and the Malayan islands, which is also one-horned; there is a Sumatran species which is very small and quite hairy, and there is a fourth which is distinguished by its hairy ears.

The two African species, both two-horned, are known as the black and the white rhinoceros, although they are almost exactly the same color. The black rhinoceros uses its first horn, which is sometimes as much as three and one-half feet long, for attacking and defending itself against an enemy, and for digging. So strong is this horn that the animal easily uproots and overturns bushes and small trees with it, that it may more conveniently feed on the foliage. In size and habits the black rhinoceros much resembles the Indian species, although it is much more savage. It remains concealed by day and wanders about at night in search of food and water. The white rhinoceros, more northerly and now nearly extinct, is even larger than the black.

Hunting the Rhinoceros. The Indian rhinoceros, because it lives in jungles and thickets of grass and reeds that sometimes grow to a height of twenty feet, can be hunted only with elephants. Sometimes it is tracked to its lair with a single elephant; sometimes a hunter, following the well-beaten track to a drinking place will surprise it wallowing shoulder deep in a mudhole. It is more common, however, to beat the animal out with a line of elephants, stationing hunters at intervals along the edge of the jungle to shoot it when it breaks from cover. While this species is believed to be quiet and inoffensive unless provoked, it turns very savage under attack and fights furiously, using its horn occasionally, but more often attacking with its long, sharp teeth. It is difficult to kill because of its thick, tough skin; for this reason, hunters invariably use steel-tipped bullets. The African rhinoceros is hunted by the natives for food, and by the big game hunters for sport. In spite of its apparent clumsiness it is a swiftly-moving animal, but it can run as fast as a horse for only a short distance.

Rhinoceros Bird. The rhinoceros has no enemies except man and the insects and vermin which infest the tender places concealed by the thickly-folded skin. It gets relief by wallowing all day in the mud and by making friends with a little bird, about the size of a thrush, which is known as the *rhinoceros bird*. It perches on the animal's head or broad back, and hops about devouring the insects which torture the huge beast. It is further believed that these birds warn the rhinoceros of approaching danger, because they have frequently been observed running about the animal's head, flapping their wings and uttering shrill, warning notes; the beast seems to understand their meaning. A.C.

Consult Hornaday's *Two Years in the Jungle;* Baker's *Wild Beasts and Their Ways.*



RHODE ISLAND, popularly called LITTLE RHODY, belongs to the New England group, and is the smallest state in the Union. The state was long known as RHODE ISLAND AND PROVIDENCE PLANTATIONS This was the name given to the colony in an early charter, and it remained in common use until 1842. The origin of the state name is uncertain, the usual ex-

planation being that it is based upon a fancied resemblance between the large island in Narragansett Bay and the Isle of Rhodes. The state flower is the violet.

Size and Location. Lying between Massachusetts and Connecticut, on the Atlantic coast, this little state, with an extreme length of forty-eight miles and a width of thirty-seven miles, has a gross area of only 1,248 square miles, about one-fourth that of the state of Connecticut and only a little over three times that of the city of New York. The water area, most of which is included in Narragansett Bay and its estuaries, covers 181 square miles.

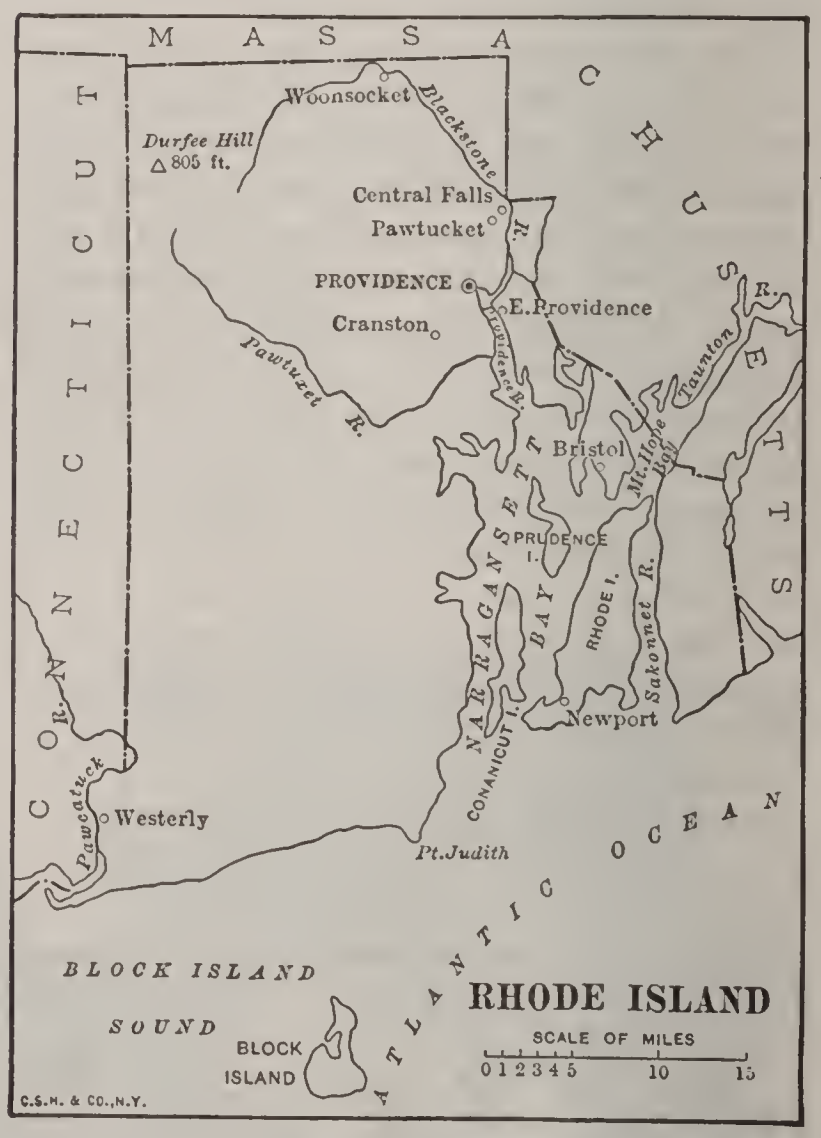
The People. Ranking thirty-eighth among the states in population, Rhode Island, with the exception of the District of Columbia, is the most thickly-inhabited division of the Union. In 1920, when its population was 604,397, its average number of inhabitants per square mile was 566.4, as compared with 35.5 for the United States as a whole. The manufacturing industries offer employment to many foreigners, and about one-third of the inhabitants are of foreign birth, chiefly French-Canadians, Irish, English and Italians. The comparative unimportance of agriculture is seen in the fact that 96.7 per cent of the population are inhabitants of cities or towns. The largest of the thirty-eight cities and towns of the state is Providence, the capital, which the 1920 census gave a population of 237,595. Pawtucket, Woonsocket, Newport, Warwick, Cranston, Central Falls and East Providence are other important cities. The population of the state on January 1, 1910, was announced by the Census Bureau as 542,610.

The first Baptist Church in America was founded at Providence, but only about one-twentieth of the population of the state belong to that denomination. Owing to the large number of French-Canadians and Irish, the Roman Catholic body is by far the largest, followed by the Episcopal, Congregational, Methodist, Friends and Presbyterian churches.

Education. Rhode Island has a highly-developed system of public schools, supported by local and state taxation. The present school organization was established in 1828 and is administered by a commissioner of education, appointed by the governor and senate, and a board of education consisting of the governor, lieutenant-governor and six other members elected by the general assembly. There is a compulsory-education law, and sixty-one per cent of the school population is in school.

There are high schools in all of the cities, and those towns having no secondary schools are required to give their young people educational privileges in towns where high schools are maintained. A normal school at Providence (with thirty affiliated training schools in different parts of the state) and an agricultural college at Kingston are maintained by the state. Other prominent institutions are Brown University at Providence, one of the best-known and oldest of Eastern universities; the Rhode Island State College, at Kingston; the Rhode Island School of Design, at Providence; and the Moses Brown School, also at Providence.

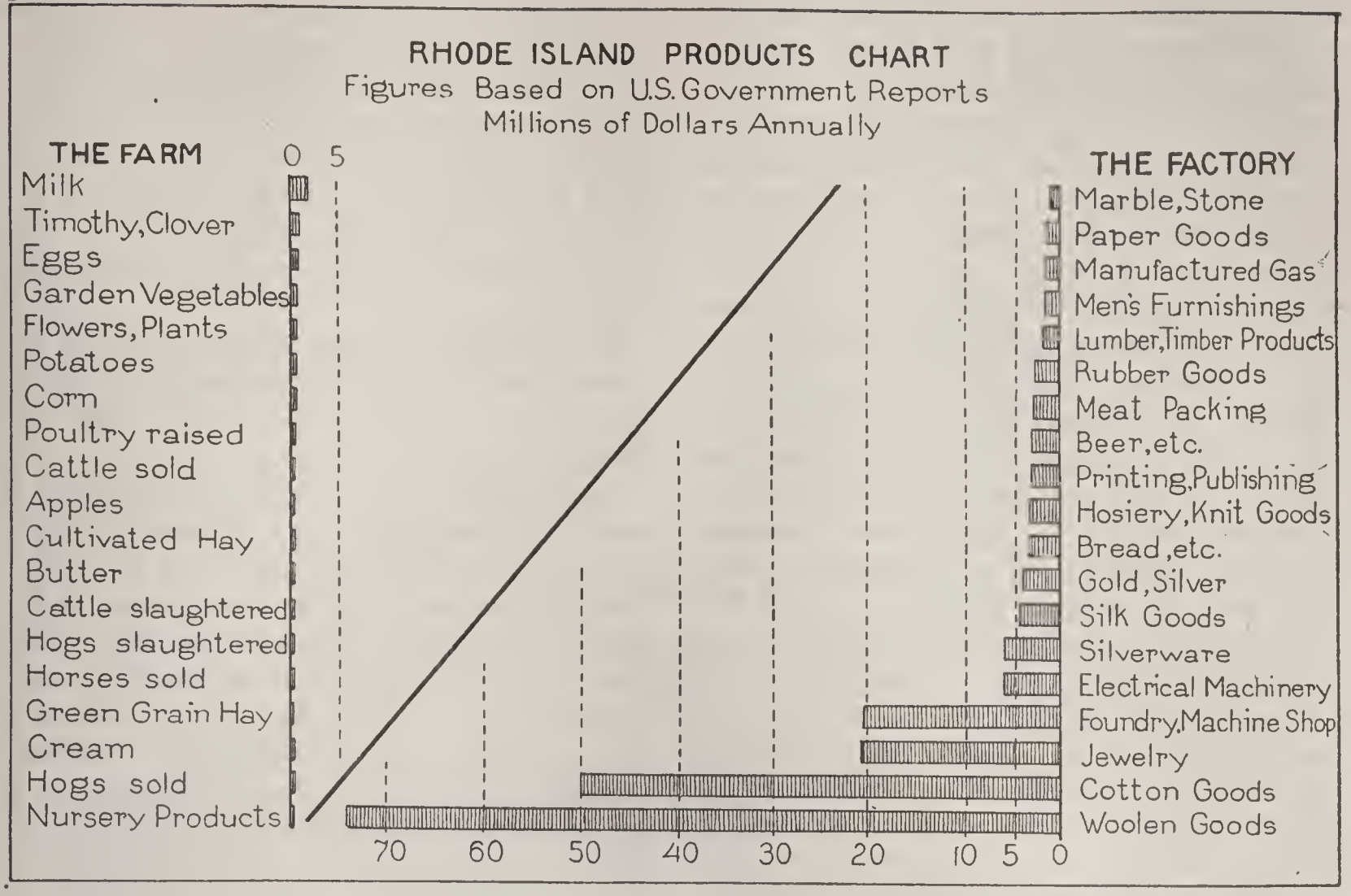
The Land. The state is generally hilly, and has a mean elevation of 200 feet. East of Narragansett Bay the grassy hills are low and rounded. West of the bay, the slopes, covered with a growth of small trees, are more rugged, but nowhere are there mountains. The



OUTLINE MAP OF RHODE ISLAND
Showing boundaries, water areas, principal cities and rivers, and the highest point of land in the state.

highest point is in the northwest at Durfee Hill, which has an elevation of 805 feet.

The south coast is bordered by sand beaches and shallow land-locked inlets or ponds, but east of Point Judith the shore often rises to high, rocky cliffs, divided by beaches of sand.



When measured in a straight line, the coast extends forty-five miles, but if the shores of its many indentations are considered, there are 350 miles of coast washed by tidewater. The largest of these inlets is Narragansett Bay, which penetrates twenty-eight miles inland, varying from three to twelve miles in width. It has many arms and estuaries, and contains a number of islands, of which the three largest are Rhode, Conanicut and Prudence islands. Rhode Island is fifteen miles long and three miles wide, and is famous for its delightful climate, fine beaches and the magnificent summer colony at Newport (which see). Narragansett Pier, on the southwest shore of the bay, is another noted summer resort. Ten miles off the coast to the south lies Block Island, a verdure-clad expanse of sandy hills. It rises abruptly from the sea and contains a good harbor in Great Salt Pond, which was formerly enclosed within the island.

Rivers and Lakes. The Providence and Sakonnet rivers are, in reality, arms of Narragansett Bay. The Pawtuxet and Blackstone rivers, emptying into Providence River, the north arm of the bay, are the largest streams of the northern part of the state. They are swift and have great volume, cascades descending fifty feet in the Blackstone at Pawtucket; a number of the falls in the Pawtuxet furnish power to run many factories. The Warren and Taunton rivers have wide estuaries, the latter emptying into Mount Hope Bay, another arm of Narragansett Bay. The Pawcatuck, forming in part the boundary between Rhode Island and Connecticut, and emptying into Little Narragansett Bay at the extreme southwest corner of the state, is the largest river of the western section. In the sheltered estuaries of these rivers and in the bays and coast waters, large quantities of lobsters and oysters are caught. The interior of the state is threaded by numerous rapid streams. Many large reservoirs have been built for the storage of their waters; these and numerous beautiful, natural ponds add much charm to the scenery.

Climate. The climate of Rhode Island is more mild than that of the other New England states, owing to the moderating influence of Narragansett Bay. There are no extremes of heat or cold, and the delightful summers have made the coast a favorite summer resort. The mean annual temperature of Providence is 50°, and of Narragansett Pier, 49°. The annual precipitation is fifty inches along the coast, and forty inches in the northern part of the state.

Agriculture. The soil, containing much boulder clay and stony drift, is generally poor, and many of the farms are becoming factory sites or are being added to the suburbs of the growing cities and towns. However, on the island

of Rhode Island and in the northwest the land is fertile, and there hay and forage, corn and oats are raised. The proximity of large markets has made truck farming very important; Cranston has one of the largest market gardens in the United States. Fruit raising is growing in importance. The raising of fine breeds of poultry, among which are the well-known "Rhode Island reds," is a thriving industry, and most farmers derive much of their income from poultry and dairy products.

Mines. The mineral wealth of Rhode Island is small, but excellent qualities of granite are quarried in different parts of the state, and limestone, graphite, clay and iron ore are found in limited quantities. Coal is mined at Cranston, and the recent high price of fuel has turned attention to the long-neglected mine at East Providence as a source of supply.

Manufacture. Rhode Island is principally a manufacturing state. Water power, near-by markets and the lack of extensive and suitable ground for other industries have caused the rapid development of factories. Textile manufactures are the chief industries, woolen and worsted goods being the most important, followed by cotton textiles. The first cotton-spinning plant in the United States was established at Providence in 1787, and Rhode Island printed the first calico made in the country. This small state now holds fourth place among the states in the manufacture of cotton goods, being surpassed by Massachusetts, North Carolina and South Carolina.

Only Pennsylvania and Massachusetts surpass it in the manufacture of woolens, and in the dyeing and finishing of textiles it follows Massachusetts and New Jersey. The state also ranks high in the manufacture of silk and silk goods, hosiery and knit goods. The manufacture of jewelry is third in importance among the industries of the state, and Rhode Island has long held first place in this industry. Foundry and machine-shop products, electrical supplies, silverware and rubber goods are other important articles of manufacture. The Union's smallest state had 2,466 factories in 1920, employing $589,937,000 capital. The value of the products that year was $747,323,000.

Transportation. Ample railroad facilities are afforded by the New York, New Haven & Hartford lines and many interurban roads; the latter operate between cities of Rhode Island and those of Massachusetts and Connecticut. There are over 200 miles of steam railroad and, in 1915, there were 436 miles of electric track.

Steamship lines operate between Providence and other bay towns and Boston, New York, Philadelphia, Baltimore and Norfolk. Large appropriations have been made by Congress for the improvement of harbors on Block Island; Salt Pond, which has been opened to the sea, forms a large, well-sheltered harbor. Customs' districts center at Newport, Bristol and Warren.

In 1915 Rhode Island led the states in the percentage of surfaced roads; in that year the state money available for road work was $180,000.

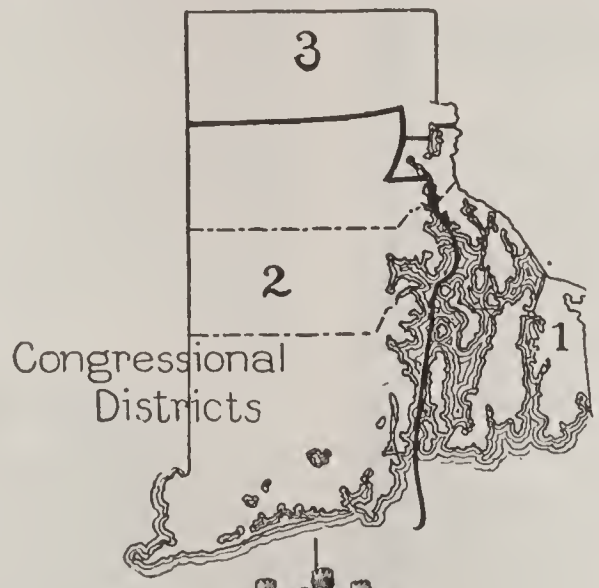
Government. The present constitution was adopted in 1842, and it has been amended many times. Before 1842 the state had been governed by the conservative constitution of the original royal charter, granted in 1643. Since 1888 property qualifications for voters in state elections have been removed, and all adult male citizens have suffrage. An interesting trace of the old conservative system survives in the provision that only those who pay taxes on $134 worth of property may vote for members of any city council, or on the levying of taxes and expenditure of public money in any town or city. This excludes large numbers of working men in factory towns from participation in municipal government. Amendments to the constitution must be passed by both houses of two successive assemblies, and must be ratified by three-fifths of the electors in town meetings. State elections are held biennially, in even-numbered years.

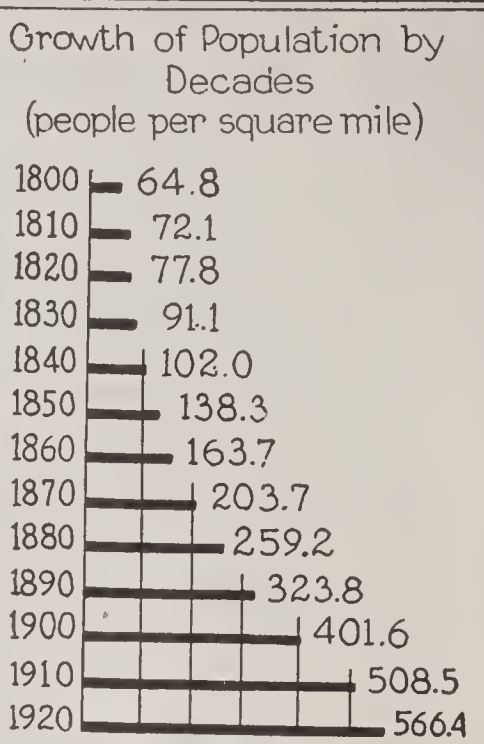
The legislative power is vested in a general assembly, consisting of a senate and a house of representatives. The senate consists of the lieutenant-governor and one senator from each of the thirty-eight cities and towns. The house of representatives consists of 100 members, apportioned according to population, each town having at least one member and none more than twenty-five representatives.

The executive department consists of a governor, lieutenant-governor, secretary of state, attorney-general, auditor, treasurer, commissioner of public instruction and various other commissioners and boards. The governor is somewhat limited in his powers, but may exercise the right of veto, which was granted to him in 1909.

The judicial department consists of a supreme court of five judges, elected by the general assembly, and of various subordinate courts. In the city of Providence there is a special police court.

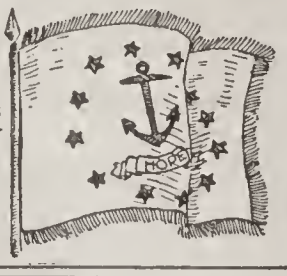
RHODE ISLAND

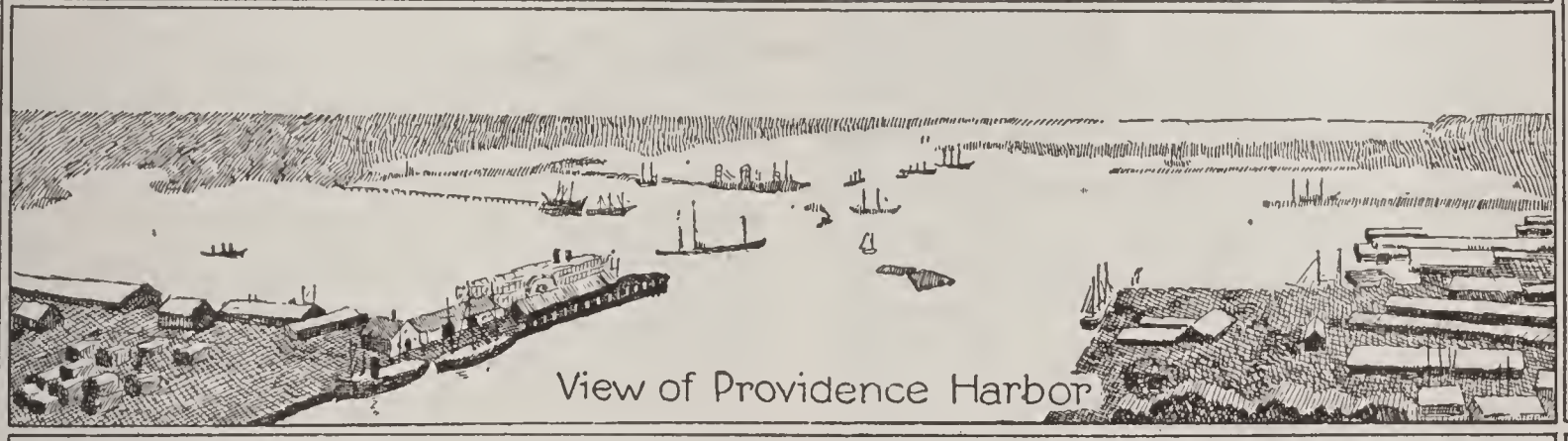




Rhode Island State Armory, Providence

Rhode Island Flag, blue and gold on white ground.





View of Providence Harbor

Rhode Island is one of the states in which there is no capital punishment. In 1915 a juvenile court act was passed, also a law regulating the report of occupational diseases and accidents.

History. *Colonial Period.* Roger Williams, a religious refugee from Massachusetts, founded "Providence Plantation" in 1637, that he and his followers might enjoy freedom in religious worship. The settlement on Rhode Island was founded one year later by John Clarke, Anne Hutchinson and others, who also sought religious freedom. A third settlement was made at Warwick in 1643, by seceders from Providence. The following year Roger Williams, seeing that a union of the settlements was necessary, secured a charter from Charles I, which united them under the name of "Providence Plantations." In 1663 the charter of "Rhode Island and Providence Plantations" was obtained, and it remained the law of the colony and state until the adoption of the "Freeman's Constitution" in 1842.

The colony suffered greatly in early Indian warfare. During the French and Indian War, Rhode Island was conspicuous in privateer warfare, and later the state continued to play an important part in naval history. The colony was active in defending American rights against English aggressions, and in 1772 the British schooner *Gaspee* was burned in Narragansett Bay by men from Providence. The British occupied Newport during a great part of the war, and several battles were fought upon Rhode Island soil. The last of the original states to ratify the Constitution, Rhode

Research Questions on Rhode Island

(An Outline suitable for Rhode Island will be found with the article "State.")

Where is there an excellent harbor which was formerly an inland body of water?

How does Rhode Island rank among the states with regard to the proportion of its roads that have been paved?

To what group of states does Rhode Island belong? How does it rank among the states of this group with reference to value of manufactures?

How many of the states of this group have a "greatest altitude" which is loftier than that of this state?

What is the ratio of railway mileage to area? How does the state compare in this respect with the two states which rank next above it in area? With the largest state in the Union?

What is the state flower? What other states have chosen the same floral emblem?

What is the "nickname" of the state?

What, so far as is known, was the reason for naming this region Rhode Island?

What city has an area almost one-third as great as that of this state? How do the two compare in population?

How many states have a larger population? How many have a greater density of population?

If the United States as a whole were as thickly settled as is Rhode Island, how many inhabitants would it have?

What does the ratio of town dwellers to country dwellers tell you about the relative importance of certain industries?

In how many other states is the capital also the largest city?

Why does it seem natural that Rhode Island should have a comparatively large number of Baptists?

What accounts for the large numbers of Roman Catholics?

Which is older, and how much, the present system of public schools or the state constitution?

Which has a greater altitude, the highest point in the smallest state or the highest point in the largest state?

How many cities of the United States are larger than the largest city in Rhode Island?

How much longer is the coast line which takes account of all the indentations than the external coast line?

What gives the longest rivers of the state their importance?

Why is the climate of Rhode Island milder than that of the other New England states?

Into what are the farm areas gradually being transformed?

Why is truck gardening so important a phase of agriculture?

Of what important manufactured article does Rhode Island produce more than any other state?

How long had the state been governed under one constitution before it adopted its present one?

What was the "corner stone" of the original colony of Providence Plantations?

What was Dorr's Rebellion, and what did it accomplish for the state?

Island formally accepted it on May 29, 1798, after amendments had been made which gave just recognition to the smaller states.

Statehood. The transition from agriculture and shipping to manufactures took place at the end of the eighteenth century, when cotton manufacturing was introduced. These industries grew in numbers after the War of 1812, and Rhode Island became a prosperous state. This progress was disturbed by Dorr's Rebellion, a political struggle which resulted in the adoption of a more democratic constitution, in 1842.

The state has kept abreast of the times in the enactment of progressive legislation. A public utilities commission was created in 1912. A maximum of ten hours per day and fifty-four hours per week for women and children in all except domestic employment is enforced, and no person under twenty-one years of age may serve as messenger for public or private dispatches before five o'clock in the morning or after ten o'clock at night. An employers' liability law is in effect. Open-air schools have been established in Providence. E.B.P.

Consult Hale's *Rhode Island;* Weeden's *Early Rhode Island;* Steffens' *a Struggle for Self-Government.*

Related Subjects. The reader interested in Rhode Island will find the following articles helpful:

CITIES

Bristol	Newport
Central Falls	Pawtucket
Cranston	Providence
Cumberland	Warwick
East Providence	Woonsocket

UNCLASSIFIED

Dorr's Rebellion	Narragansett Bay
Hutchinson, Anne	Williams, Roger

RHODES, *rohdz,* a volcanic island lying off the southwest coast of Asia Minor, now belonging to Turkey. It is forty-nine miles long and twenty-one miles at the widest part. The climate is temperate and healthful, and the valleys are very fertile, producing oranges, citrons and other fruits and oil. A range of mountains runs through the length of the island, with Mount Ataijros 4,070 feet above the sea. The population is about 30,000, chiefly Greeks.

In early days Rhodes was a wealthy and independent state of Greece, famous for its poets, artists, philosophers, and for its *Colossus,* which was considered one of the Seven Wonders of the World. In 1309 the Knights Hospitalers of Saint John made it their stronghold and held it

against repeated attacks till 1522, when they were compelled to abandon the island to the Turks. In Turkish hands it has since remained; its glory has departed and the island shows few signs of its former grandeur. The modern capital is Kastro. See SEVEN WONDERS OF THE WORLD.

RHODES, CECIL JOHN (1853-1902), a British colonial statesman and empire builder, during his lifetime the most eminent representative of England in South Africa. He was born at Bishop Stortford, in Hertfordshire, studied in the grammar school there, and in 1870, instead of entering college, was sent by his family to Natal, South Africa, because of ill health. In the next year he made his way to Kimberley, where diamonds had been discovered, and within the space of two years had made an independent fortune.

CECIL RHODES
South African empire builder, and founder of the Rhodes Scholarships.

His health restored, he determined to have the university education which earlier he had been compelled to forego, and from 1876 to 1881 spent half of each year at Oxford, where he graduated in 1881. Meanwhile, he did not neglect his business pursuits, but succeeded in combining into the De Beers Consolidated Mines most of the companies operating in Kimberley.

In 1881 he was elected to the Cape assembly. His purpose was already formed—to advance British imperial authority in South Africa—and he at once set himself to its accomplishment. Bechuanaland was annexed to the British possessions in 1884 through his efforts, and four years later valuable concessions were gained from the Matabeles, who practically surrendered to England the territory known as Rhodesia. Of the latter the British South Africa Company was put in charge, and Rhodes was the dominant influence in the company.

As premier of Cape Colony, an office to which he had been chosen in 1890, Rhodes planned and promoted the Cape-to-Cairo Railway, did his best to bring about local self-government, and crushed a serious rising among the Matabeles. At first he labored to establish friendly relations between the Dutch and English colonies, but later, when it seemed that English expansion must be at the expense of the Dutch, he did not hesitate to interfere in the politics of the Transvaal, and thus was in a large measure responsible for the Jameson Raid of 1895. He resigned his position as a result of that unfortunate incident, and withdrew to Rhodesia, where his influence was still paramount. In a second outbreak among the Matabeles he again proved his courage and his knowledge of men. When the South African War broke out Rhodes was at Kimberley, and he assisted in the defense of the city.

He died before peace was restored, and was buried on his estate in the Matopo Hills. Ten years after his death a monument was dedicated to him on Table Mountain, six miles from Cape Town. As important as any feature of Rhodes' life work was his will, by which he left his fortune to the public service. Most important of his bequests was that to Oriel College, Oxford, for scholarships. Rhodes takes rank with other renowned builders of empire whom Great Britain honors; and while certain of his acts have been severely criticized, it seems from his will that the steadfast purpose toward which his whole life was directed was the spread of empire, not merely for England's sake but because to him this seemed one of the greatest possible agencies for the good of the world. A.MC C.

Consult Hensman's *Life of Cecil Rhodes,* and *Cecil Rhodes: His Political Life and Speeches,* by "Vindex."

Related Subjects. The following articles in these volumes will give additional information and make clear the references in the above discussion:

Cape-to-Cairo Railway	Rhodes Scholarships
Jameson, Leander Starr	South African War
Matabele	Transvaal
Rhodesia	Union of South Africa

RHODESIA, an inland protectorate of the British Empire in South Africa, extending from the Transvaal on the south to Belgian Congo on the north. The Zambezi River divides it into two sections, Northern Rhodesia and Southern Rhodesia, both of which are under the administration of the British South Africa Company. Northern Rhodesia has an area of about 290,000 square miles, Southern Rhodesia of 148,575 square miles. The name was derived from that of Great Britain's "empire builder"—Cecil Rhodes.

Northern Rhodesia. This region is chiefly an elevated plateau, sparsely covered with trees.

There are several large sections suitable for farming and grazing, and good crops of corn, cotton and tobacco are grown. The native rubber forests, covering several thousand acres, are carefully protected. There are gold, copper, lead and zinc mines in the protectorate, and the mining of coal is a future possibility. Northern Rhodesia has several navigable waterways, and a railway crosses the country from Livingstone, on the Zambesi, to the Congo border. The most important towns include Livingstone, the headquarters of the British administrator, Fort Jameson, Fife, Abercorn, Fort Rosebery, Broken Hill and Lealui. There is a permanent European population of about 2,250, and a native population (Bantu negroes) estimated to be 928,000. See AFRICA, subhead *The People.*

LOCATION OF RHODESIA

Southern Rhodesia. This section is a prosperous farming country, and is rich in minerals, including gold, coal, copper, silver, iron, antimony, arsenic and lead. Diamonds are mined to a limited extent. About $180,000,000 worth of gold was worked during the year 1914, which witnessed the outbreak of the war in Europe. The chief products of the farms are European cereals, vegetables, fruits, Kafir corn, maize, tobacco and cotton. Considerable attention is given to the live-stock industry, high-bred animals being imported for breeding purposes. Southern Rhodesia is divided into two provinces, Mashonaland and Matabeleland, the former having 500,000 native inhabitants and 18,500 whites (census of 1921), and the latter, 265,000 natives and 16,000 whites. The chief towns of Mashonaland are Salisbury (the seat of government of Southern Rhodesia), Hartley, Umtali, Victoria and Gatooma; of Matabeleland, Buluwayo, Salukwe and Gwelo (the center of the diamond industry). There are several branches of the Rhodesian Railway system in the protectorate, and the country is traversed by the Cape-to-Cairo Railway (which see).

RHODES SCHOLARSHIPS, *rohdz skol'ar ships,* a system of scholarships, founded by the will of the late Cecil John Rhodes (1853-1902), by which selected students from the British colonies, Germany and the United States are entitled to three-years' residence and study at the various colleges of Oxford University, England. The scholarships are apportioned in the following manner: Rhodesia, 9; Cape Colony, 12; Natal, 3; Australia, 18; New Zealand, 3; Jamaica, 3; Canada, 24; Newfoundland, 3; Bermuda, 3; United States, 96 (2 for each state); Germany, 15. The German scholarships have each an annual value of $1,250, all others, $1,500; the smaller value of the former is due to the shorter distance German students are obliged to travel.

This generous foundation represents the supreme purpose in the life of the great colonial statesman, himself an Oxford man—to upbuild and perpetuate the British Empire, and to effect a closer union among the English-speaking peoples of the world.

Selection of Scholarship Holders. Mr. Rhodes specifically stated that he did not desire mere "bookworms" to enjoy the scholarship advantages, but that the students elected should be all-round men, of superior scholarship, athletic tastes and high character, and must be unmarried. The age limits set by the will were 19 and 25, but the following exceptions occur: West Australia (17-25), Queensland and Jamaica (18-25), Newfoundland (18-21) and South Africa (19-24). It was desired to select men old enough to appreciate the benefits of residence at Oxford, and young enough to adapt themselves readily to the new conditions. The mode of selection was left in the hands of committees in the various states and colonies. In the United States the chairmen of these committees are presidents of state or other prominent universities. The German scholars are appointed by the emperor.

Conditions Governing Selection. Each candidate for a Rhodes scholarship is required to pass an examination in Greek, Latin and mathematics, known as *Responsions.* These examinations are not competitive, however, but are merely to test the applicant's fitness for the honor. Students in attendance at colleges affiliated with Oxford are exempt from Responsions. The first Oxford examination in the United States was held in 1904. Except in Massachusetts, where candidates from secondary schools are accepted, American applicants must have reached the end of the second year in some university or college which grants degrees. Candidates must submit certificates of age and a statement of their educational and athletic qualifications. In nearly all cases the candi-

dates are interviewed in person by the selection committee. Similar regulations obtain in the British colonies, with such modifications as are made necessary by local conditions.

The Rhodes Scholars. The Rhodes scholars may, at Oxford, enter the undergraduate or the graduate departments, and they may compete for honors and strive for degrees. Up to the present time the majority have shown a preference for law or jurisprudence, so the Rhodes scholars will some day help to fill the ranks of distinguished public men. Reports on the standing of American holders of these scholarships are both interesting and illuminating. The American Rhodes scholar is praised for his energy, versatility and interest in his work, but in scholarship he is regarded as superficial and inaccurate, as compared with the English student. B.M.W.

Consult Parkin's *The Rhodes Scholarships;* Scholz and Hornbeck's *Oxford and the Rhodes Scholarships;* Wylie's *Cecil Rhodes and his Scholars as Factors in International Conciliation.*

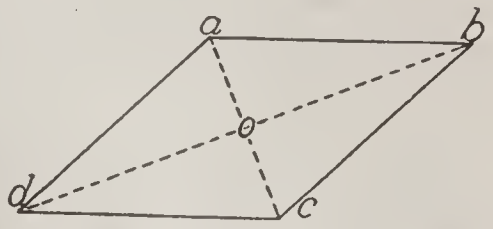
RHODODENDRON, *ro doh den' dron,* a genus of trees and shrubs belonging to the heath family. The group includes several species which are known for the beauty of their flowers and for their evergreen foliage. One of the best known is the *great rhododendron,* or *wild laurel,* which grows profusely in the Alleghany Mountains and there forms almost impassable thickets through the interlocking of the branches. This rhododendron is a shrub or small tree, which rarely grows higher than thirty-five feet. Its large, white or rose-colored, bell-shaped flowers, when seen against the background of glossy evergreen leaves, are magnificently beautiful. Another species, the *catawba rhododendron,* is a shrub that is common in Virginia. It produces brilliant lilac-purple flowers, and is a popular plant in the gardens of large estates, great numbers being shipped north for transplanting. Other species are found in the Pacific coast region, and some magnificent specimens grow in the Himalayas and other mountainous regions of India. Numerous varieties have been developed by nurserymen. The states of Washington and West Virginia have adopted the rhododendron as the state emblem.

RHODODENDRON

Consult Watson's *Rhododendrons and Azaleas.*

RHOMBUS, *rom' bus,* a plane figure bounded by four equal straight lines, whose opposite sides are parallel and whose opposite angles are two equal acute and two equal obtuse angles. A rhombus may be converted into a rectangle of the same base and altitude as the rhombus (see *Parallelogram* under MENSURATION). Therefore *the area of a rhombus is equal to the area of a rectangle having the same base and altitude as the rhombus.* Note that the *altitude* is the *perpendicular* distance between the base and the opposite side.

The area of a rhombus is also equal to one-half the product of its diagonals. This may be seen from the accompanying illustration.



[Explanation of the figure is given in the text.]

The rhombus is divided into two equal triangles, *ac* being the base of each of them, *ob* the altitude of one and *od* the altitude of the other. Area of triangle $abc = ac \times \frac{ob}{2}$. Area of triangle $adc = ac \times \frac{od}{2}$. Area of rhombus $= ac \times \frac{bd}{2}$.

Not all mathematicians agree on the meaning of the term *rhombus.* Rhombus is defined by two leading writers thus: "A parallelogram that has two adjacent sides equal." "A rhombus is an equilateral parallelogram." These and others include the *square* in the term. But in general practice the distinction as to angles, the square having right and the rhombus oblique angles, is observed. Thus the definition given at the opening of the article is the one most generally accepted. A.H.

RHONE, *rohn,* the most important commercial river of France, rises in Switzerland in the Rhone glacier, 7,550 feet above the sea. It flows through Lake Geneva and southwest to the city of Lyons, France, where it turns abruptly south, and forming a large delta, empties into the Gulf of Lyons, an arm of the Mediterranean Sea. The river is 500 miles long and is navigable for 350 miles; its chief tributaries are the Saône, which meets it at Lyons, the Isère and the Durance. By a series of great canals, navigation from the Rhine, the Seine, the Loire, the Meuse and Belgian canals is continued to the Rhone, making it the great

artery of river traffic to the Mediterranean, the chief commercial waterway, possibly excepting the Danube, leading from Europe to Asia.

The Rhone is famous for the beauties of its wooded banks, upon which are situated many picturesque old fortresses and châteaus.

RHUBARB, *roo'barb,* more familiarly known as *pieplant,* is a perennial herb whose reddish, juicy leafstalks, stewed with sugar, furnish the tart sauce and appetizing filling for pies which wise cooks give their families before the fresh fruits are in season. The plant is botanically related to the sheep sorrel, dock and buckwheat.

It is only within the last hundred years that the stalks have been used in cooking. When it was introduced into England in Queen Elizabeth's time, the leaves alone were gathered for use as a pot herb, and the roots were valued as medicine. As a matter of fact, rhubarb is not strongly nutritious, 56.6 per cent of its content being water and 40 per cent waste, but its acid quality makes it an admirable spring "tonic." Eaten to excess, however, it tends to make the blood too thin. In many homes it is canned for use in the winter, and by some people the juice is made into a wine.

The common garden rhubarb came originally from Southern Siberia, but is now cultivated extensively in other cold or temperate countries. Warm climates are not favorable to its growth. As a rule the plant is propagated by dividing the roots of an old plant, although it can also be grown from seed. A mammoth pieplant recently developed by Luther Burbank has leaves measuring three to four feet across.

The stalks are not ready to pull until two years old, but after that they may be gathered every spring for several years. They are most tender and juicy when raised by the forcing process. The usual method is to set the roots one spring in deep, rich soil, dig them up in the late fall, and then force them either in greenhouse or cellar or in a hotbed improvised out-of-doors by covering the roots with a barrel, box or flowerpot, closely banked with manure. The choice product that will be ripe by early spring finds a ready sale.

In Europe the most common use to which rhubarb is put is as an ornamental plant in gardening, for its huge leaves with their rippling outline make most effective borders and backgrounds. There are a number of species grown solely for this purpose.

The Rhubarb of Pharmacy. The bitter rhubarb root used as a cathartic has been known to the Chinese for over five thousand years, and comes from an Asiatic variety of the plant. The Chinese still supply the highest grade, the true Oriental rhubarb, cultivating the roots for six years before using them. A cheaper and less potent drug is prepared from a similar variety grown in England and some other parts of Europe and exported to America. At one time this was also used in dyeing French silks.

RHYME, *rime,* a word variously used in connection with poetry. In a wide sense it is taken to mean poetry in general; or more specifically, one of the attributes of such poetry, the identity of sound in the last syllable or syllables of two or more words. At least one accented syllable must be included to make a true rhyme.

Rhyme is of comparatively late development, the Greeks and Romans having known nothing of it in their poetry, while in Anglo-Saxon poetry its place as an ornament was taken by alliteration, the identity of initial consonant sounds. To-day, however, most literatures make use of rhyme; in some, indeed, as in French, it is absolutely essential to poetry. In English the vowel sound of at least the final syllable of rhyming words must be the same, and also the consonant sound which follows, if such there be, but the initial sound should by preference be different. Thus, *true* and *blue* rhyme; *approve* and *remove; number* and *slumber;* but *describe* and *ascribe* do not constitute a good rhyme because the *scr* sound is identical at the beginning of the rhyming syllables. It will be noted in the examples of rhyme words given above that in some instances the rhyme is in the last syllable only, while in others it includes two syllables. The former kind is *single,* the latter *double,* rhyme. There may be, also, a *triple* rhyme, as in *identity, nonentity,* but it is seldom made use of in serious verse.

Of course, the aim of a poet is to make his rhymes perfect, but often there are found in good poetry such combinations as *pain, again,* or *none, own,* while some poets take great liberties with their rhymes. Thus, in Browning is to be found *fabric* rhymed with *dab brick,* while Lowell, in his *Fable for Critics,* makes use of such forms as *irresistible, whist table.* These last are, however, humorously intended.

Rhymes usually occur at the ends of lines, though often they occur in the middle. This form is found in Shelley's—

> Then I widen the *rent* in my windbuilt *tent,*
> And the calm rivers, lakes and *seas*

Like bits of the *sky* fallen through me on *high*
Are paved with the moon and with *these.*

Consult Lanier's *Science of English Verse;* Matthews' *Study of Versification.*

RIBBON, *rib'un,* a narrow, woven cloth of any width up to nine inches. The distinguishing feature of a ribbon is really a technical part of the manufacturing process: on an ordinary loom only one width of cloth is woven at a time, whereas on a ribbon loom at least two widths are woven side by side. On some modern looms as many as forty different ribbons can be woven at the same time. The buyer or user has no way of knowing how many widths were woven on a single loom at one time, and any woven fabric not more than nine inches wide is now called a ribbon. Practically all ribbon is made of silk or a silken mixture. It is used for binding and tying, in women's and children's dress, in wrapping packages, for festoons and decorations, and for a thousand other purposes.

The manufacture of ribbon is a distinct branch of the textile industry. Hand looms on which several narrow "webs" could be woven at one time were in use at Danzig as early as 1600, and at Leyden a few years later. Ribbons are known to have been woven by hand in the eleventh century near Saint Etienne, France, which is to this day a center of ribbon making. Basel in Switzerland, Crefeld in Germany, and Coventry in England are great manufacturers of ribbon. In the United States the annual production exceeds $30,000,000, more than seventy-five per cent of the total being made in Pennsylvania and New Jersey.

RIBOT, *re bo',* Alexandre Félix Joseph (1842-), a French statesman, born at Saint Omer and educated at the Lycée in that city, and in Paris. Admitted to the bar, he acquired a large practice, and in 1878 was elected to the Chamber of Deputies. In the Cabinet of Freycinet (1890-1893) and Loubet he was Foreign Minister, and in 1892-1893 he was president of the Cabinet. The investigation of the Panama Canal scandals took place while he was in that position. In 1893 he again became premier, but his ministry was short-lived. Ribot was generally conservative in his views, especially on questions of colonial policy.

RICARDO, *ri kahr'doh,* David (1772-1823), a British economist, born in London. His father, who was a Dutch Jew, had him educated in Holland and gave him a place at the age of fourteen in his office in the London Stock Exchange. At nineteen he turned from the Jewish religion, joined the Church of England and married a Gentile. His father renounced him and threw him upon his own resources, but Ricardo was so shrewd in business that he made a fortune before his twenty-fifth birthday. After that year he devoted more and more of his time to the study of political economy and in 1809 wrote his first treatise on the subject, a discussion of the money question.

In 1817 he completed *Principles of Political Economy and Taxation,* a book that for more than half a century profoundly influenced all thinkers and writers in the field of economics. Among his theories the following are most important: that increase of wages does not raise prices; that profits can be realized only by a fall in wages; that profits are determined by the cost of the necessary food which is produced at the greatest expense, and that wages cannot in the long run exceed the least amount necessary for the well-being of the laborer. This last statement is often called the "iron law of wages."

RICE. Although many of the great world-foods belong to the family of grasses, there is no more important member of that family than the extensively cultivated grass we know as *rice.* Half the population of the entire earth finds the greater part of its food in the seed of the rice plant. The popularity of the grain is far greater, however, in Oriental lands than in the countries of the western hemisphere. Japan, indeed, is sometimes called the "Land of Rice-Ears," and it is as natural to associate the thought of rice and chopsticks with Chinamen as to connect the idea of spaghetti and macaroni with Italians. Rice is more to Asia than corn and wheat are to North America.

An Ancient Grain and a Far Traveler. The ancestor of the rice we eat to-day was a wild grass fringing the lakes of India and Northern Australia, called by the Hindus *nivara.* The Latin name is *oryza,* from which our word is derived. How many centuries ago man first began to cultivate this prolific grass no one knows. Many Hindu rites still performed with rice grains are so ancient that their original significance is now entirely forgotten.

The antiquity of rice culture in China is indicated by a ceremony dating back three thousand years before Christ, in which emperor and princes honored the rice planting by sowing a handful of seed with their own royal hands. In Italy rice was not cultivated until about twenty-five years before the discovery of the New World.

In 1647 an unsuccessful attempt was made to grow it in Virginia. The first romantic chapter of the real story of the American rice industry, however, was written in 1694, when a Madagascar ship damaged by a storm took refuge in the harbor of Charleston, S. C. Before it sailed away its captain presented the governor of the colony with a sack of seed-rice, which was planted in various kinds of soil with such good results that the first crop yielded almost enough

HOW RICE GROWS

to supply everybody in South Carolina. From this chance beginning rice growing has spread to other parts of the United States, where soil and climate are adapted to the special needs of the plant. The temperature it requires for ripening is between 60° and 80° F.

Its Thirsty Habits. Since rice traces its family history back to a shore grass, it is only natural to find that it has inherited habits of growth demanding a great deal of water. It likes rich mud to root in, especially with a layer of clayey soil beneath to hold the moisture; and most of the time, except during actual cultivation, it is necessary to keep the ground flooded to a depth of many inches. At a distance a growing rice field looks like an emerald lake.

The fertile deltas of great rivers—the Tigris, Euphrates, Ganges, Irrawaddy, Yang-tse-kiang, the Nile and the Mississippi—are marvelously well adapted to the needs of this aquatic grain because they are subject to flooding from the overflow. So are the well-watered plains and river-bottoms of India and China, and the low swamps and reclaimed tidelands of the South Atlantic and Gulf states. The Hawaiian Islands, the Philippines, Japan, Korea, Ceylon, the West Indies, and parts of Central and South America are all good rice-growing districts because of their well-irrigated valleys and abundant rainfall.

Where there is less natural moisture there must be artificial irrigation; and, therefore, in the prairie regions of Texas, Louisiana and Arkansas great pumps operated by steam or gasoline bring water to the rice plantations from near-by wells and streams. In India, where drought and famine have afflicted the people for countless centuries, the British government is spending millions of dollars on irrigation canals. In many parts of China and Japan the water is pumped up to the terraced rice fields by treadmills at which men and boys, or blindfolded bullocks and water buffaloes, labor all day long. Often it is brought up in buckets passed from hand to hand. Where the country is rugged, as in certain districts of Java, China and Japan, the mountain streams plunge from terrace to terrace, supplying natural irrigation.

Upland Rice. There is an upland variety that can be grown without water culture, in practically the same way as oats and wheat. Some claim that it is even superior in quality to the ordinary lowland rice, although it does not yield so abundant a crop.

The Rice Field and Its Cultivation. Ridges or embankments of earth divide the rice field into many smaller fields separated by canals equipped with dams, sluices and floodgates, by means of which they can be flooded or drained, as the needs of the plants may require. Since salt water is fatal to rice, plantations which, like those of South Carolina, depend upon the tides for flooding are situated sufficiently far from the sea to be free from salt water and carefully protected by dikes. They are flooded from the river at high tide and drained at low tide.

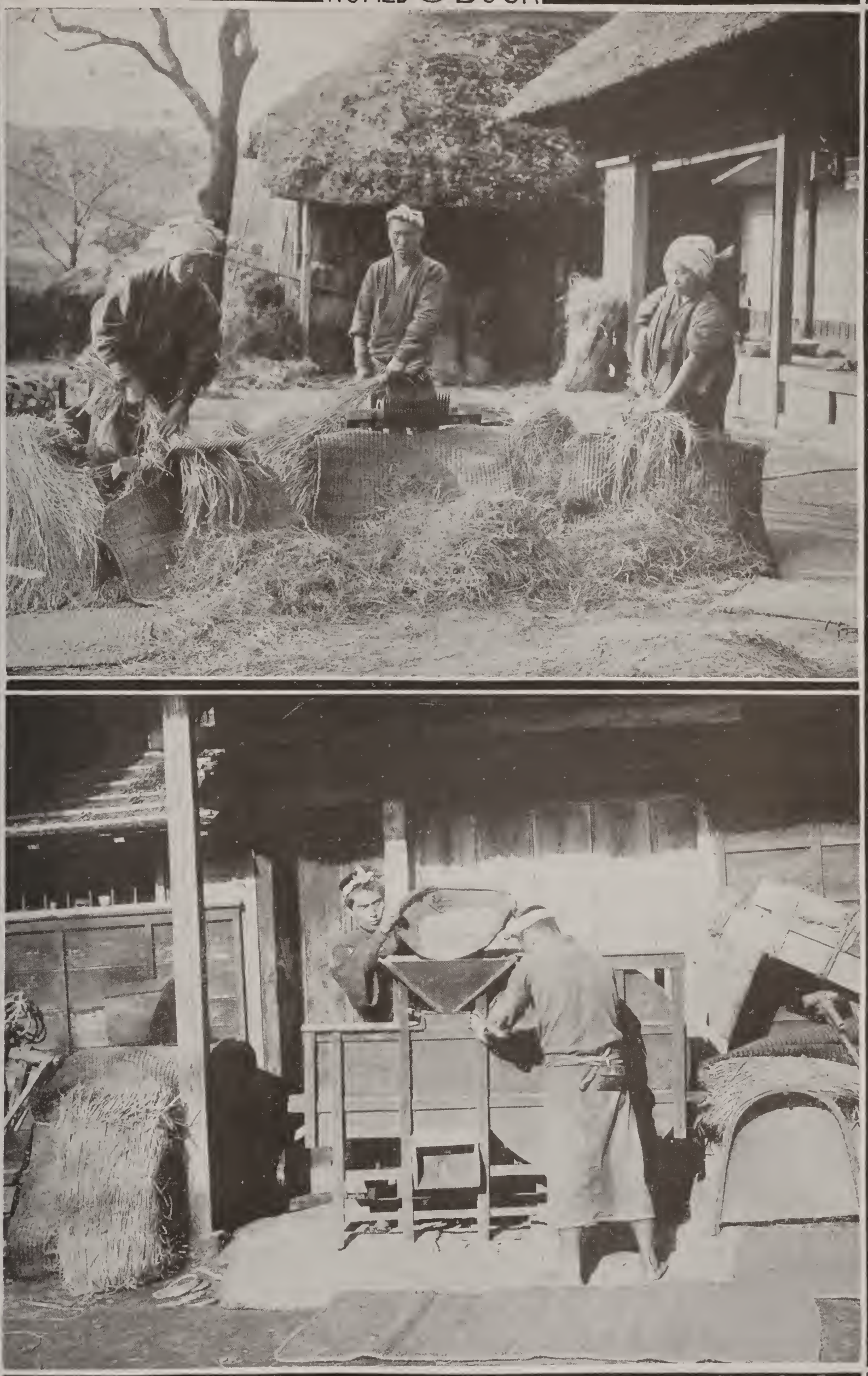
The great rice plantations of the Southern United States have introduced modern agricultural machinery, thus revolutionizing an industry which once received only hand cultivation. The South Carolina soil is too soft and marshy to permit the use of heavy farm machines, but that of the Texas and Louisiana rice region, artificially irrigated, is sufficiently solid to be cultivated according to the labor-saving methods which have made American agricul-

THE STORY OF RICE.

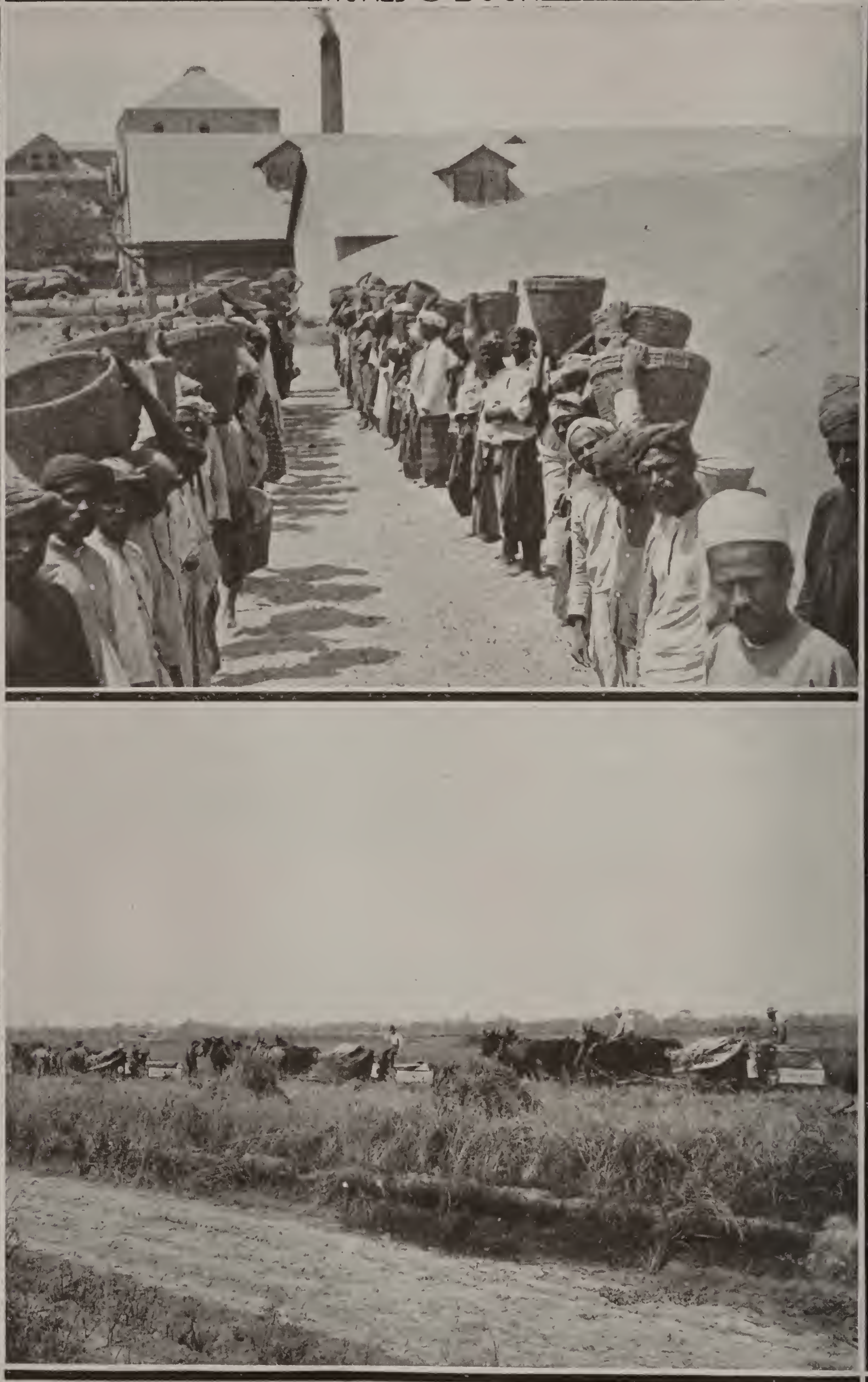
Plowing the field and planting rice, as it is done in Japan.

THE STORY OF RICE.

Weeding and harvesting scenes in Japan rice fields.



THE STORY OF RICE. Country people stripping grains of rice from stalks by drawing through frames with teeth. Below: Cleaning rice.



THE STORY OF RICE.

A small mountain of rice at a Burma cleaning mill. Below: A rice harvest in Louisiana.

tural progress the wonder of the world. Here the seed is planted with a machine drill and the ground kept in the condition of mud until the young sprouts appear, when the water is drawn off. When the plants are six or eight inches high the field is plowed and hoed and again put under water, remaining in that state for approximately three months.

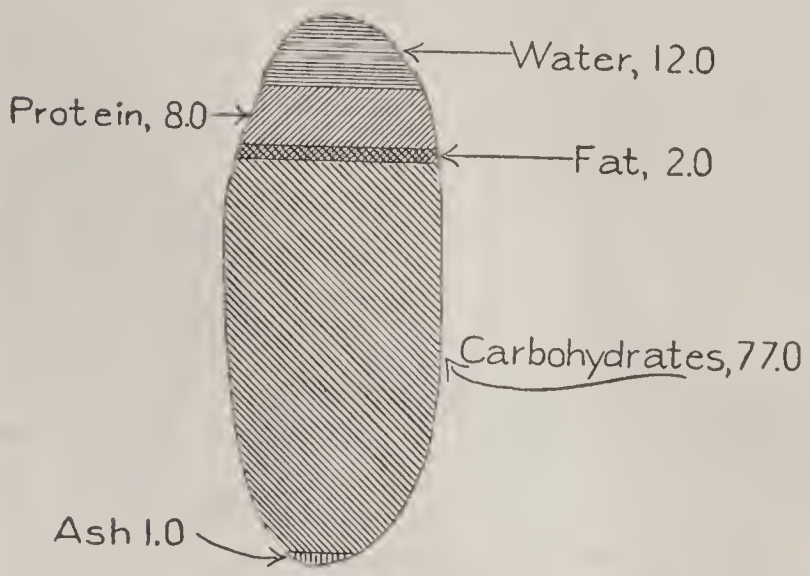
In Oriental countries the seed is usually sown broadcast in richly fertilized seed beds of half-liquid mud, and the young sprouts transplanted when they are two or three inches high. They complete their growing in standing water, the ground being kept soft by raking or by a process of "hoeing with the toes," which is peculiar but effective. Full-grown rice reaches a height ranging from two to five feet.

Enemies of the Rice Field. Drought is the greatest enemy of rice. The spring freshets which so often sweep away the young crop or kill it with too much water come second in destructive power. Harmful weeds thrive in the rice fields and must be carefully uprooted, a wild rice with red grains being among the most dangerous, since it spreads with amazing rapidity and greatly lowers the value of the crop. One of the dreaded bird enemies of the rice crop in the United States is the bobolink, which Southerners know as the *ricebird;* in Eastern countries it is a certain species of weaver bird, called the *Java sparrow* or *paddy bird.*

Harvesting and Threshing. When the rice straw begins to turn yellow the field is drained to put it in shape for harvesting. In the United States reaping machinery is used to cut the grain; in the Orient the primitive sickle or a small knife does the work. After stacking and drying the sheaves, the rice must be threshed. In foreign rice-growing countries crude methods are employed which have been handed down from generation to generation. In India, for instance, the heads are separated from the stalks by the tramping hoofs of oxen; in China, Japan and many other places, by the slow and patience-trying process of drawing a handful of sheaves across an iron comb set in a frame, or by striking an antiquated flail upon a threshing floor.

Making Paddy into Rice. The threshed rice is still *paddy*—that is, enclosed in a hull—and this husk, which "sticks closer than a brother," must be removed before the rice can be cooked or marketed. In the East the natives usually store the unhusked rice intended for home consumption and clean small quantities as needed. In some places the husks are pounded off in stone mortars, sometimes worked by hand and sometimes by crude machinery. In other places the paddy is stamped upon by animals or by coolies, beaten by flails, or ground off between millstones. The rice which is to be exported is husked at the mills by machinery, and Rangoon, in Indo-China, the greatest rice market in the world, has as modern a mill as any of the great rice centers of America. During the milling process the rough grains are smoothed and polished between revolving bands of soft chamois or moose-hide. After this they are graded according to size and barreled for shipment.

The Food Value. The polishing removes an exceedingly nutritious part of the grain—the fine flour put on the market as rice polish. The natives of rice-growing lands are usually too poor and too wise to insist upon the beautifully lustrous, pearly-white grains that their foreign customers demand, and the rice they eat is therefore a far more substantial food than our cereal. When they do eat the polished grains they are liable to contract the disease known in Japanese as *beriberi-kakke.*



COMPOSITION OF RICE

It has a fuel value, when boiled, of 510 calories per pound. This is only about one-third that of corn or wheat, but is equal to that of chicken or the average cut of veal.

Rice has not the food value of wheat or corn, however, for it is deficient in fat and protein. It is principally meal or starch, and needs to be supplemented by other foods which are richer in fat and protein. Orientals usually combine with it the sauce called *soy,* made from beans; Americans eat it with milk, syrup or gravy. In cooking it should not be boiled, but steamed until the grains break open.

Other Uses. The famous Japanese drink called *sake,* or rice-wine, is fermented from the rice grains. In India they distill a liquor from rice which they call *arrack,* and the Chinese also use it in preparing various intoxicat-

ing spirits. A favorite hot-weather drink in India is rice water flavored with lemon and sugar. Rice bran, polish and straw are used as fodder for pigs and cattle. A mixture of bran and polish is marketed as rice meal. Out of the straw, sandals, hats and wrappers are manufactured, and the polish makes a valuable fertilizer. The hulls are used as we use excelsior. Rice starch is an important by-product. Rice paper, so-called, is misnamed, because it comes from an entirely different source—a small tree native to Formosa.

Canada, Wild or Indian Rice. Along the edges of lakes in Canada and the northwestern portions of the United States there grows wild a tall grass bearing long, black grains. This is *Canada rice* or *Indian rice*, the favorite food of ducks, geese and other wild fowl. Gathered by the Indians, it is eaten parched or as a porridge. It is marketed to a limited extent in the United States. There is a large demand

WHERE GROWN IN THE UNITED STATES
The star, in South-Central Louisiana, indicates the center of production.

for wild rice as a game food, but it is difficult to harvest because the seeds ripen continuously throughout the fall months and drop into the mud as soon as they mature, so that gathering it involves daily trips.

Some Interesting Figures. The countries of Asia grow about ninety-six per cent of all the rice raised in the world, which is estimated at 100 billion pounds or 2¼ billion bushels of clean rice, per annum. This does not include the crop of China, for which no figures are available. China is the largest producer, in many parts of the country two crops being raised each year and a third one started and turned under green as a fertilizer. The United States production for 1920 was nearly 1,100,000,000 pounds of rice, valued at over $90,000,000,—a record-breaking crop, both for size and value.

Louisiana leads in rice production, its fields yielding one-half of the entire United States crop; Texas comes second, Arkansas third, California fourth, and South Carolina fifth. There is some rice-growing also in Mississippi and Florida. The industry is on the decline in South Carolina on account of the growing competition of the plantations where the use of machinery permits a vastly greater output. California grew its first commercial crop in 1912 in the fertile Sacramento Valley, and already has a larger average production per acre than any other state.

It is likely that in the not-distant future American rice fields will not only fully supply American markets, which have hitherto imported extensively from Europe and Asia, but will export their superior product to foreign countries. Figures show that in Japan a native works 120 days to produce an acre of rice. In India it takes 120 days to accomplish the same result, using a pair of oxen for twenty days. In America the production is achieved in two days of human effort, with a team of horses helping for a day and a half. Thus, brains and machinery are combining to give to a country where the industry is still in its infancy an output of from forty to sixty times that reached in lands where it has been practiced from time immemorial. L.M.B.

RICE, Alice Caldwell Hegan (1870-), an American story-writer, born at Shelbyville, Ky., educated at Hampton College, and married in 1902 to Cale Young Rice, a poet and dramatist. She wrote a few short stories which attracted no attention, but on the publication, in 1901, of *Mrs. Wiggs of the Cabbage Patch,* she became widely known. The sale rose to 40,000 a month, and forty-three editions were printed; it was translated into French, German and Swedish, and was dramatized successfully. Its charm lies in its homely humor and its constant optimism, and these qualities appear in only slightly lesser degree in Mrs. Rice's later works, *Sandy, Lovey Mary, Mr. Opp* and *A Romance of Billy Goat Hill.*

RICE INSTITUTE, a school founded for higher education of men and women in Houston, Texas, by William Marsh Rice (1816-1900). For this purpose he bequeathed his entire fortune of $10,000,000, accumulated in the cotton business. The 300-acre campus was purchased in 1909 and two years later four buildings were completed or in process of construction. After 1918 the trustees decided to add one new building each year. The courses of study were intended to parallel those of the older schools of university grade, with particular stress upon the sciences. The founder was killed by the use of chloroform administered by his valet.

RICH'ARD, the Christian name of three English kings who ruled between 1189 and 1485.

Richard I (1157-1199), who reigned from 1189 to 1199, has come down in history as RICHARD THE LION-HEARTED (Richard Coeur de Lion). He was one of the five sons of Henry II, first king of the Plantagenet dynasty. Shortly

RICHARD THE LION-HEARTED

after Richard ascended the throne he joined Philip Augustus of France in an expedition to the Holy Land. In 1192, while on his journey home, he was seized by Leopold, Duke of Austria, and confined in a castle on the Danube as a prisoner of Emperor Henry VI. There he remained until a heavy ransom was secured for his release. It is said that while he lay in prison his favorite minstrel sought him out and made himself known by singing to his master outside the castle. This romantic tale, given more fully in these volumes in the article BLONDEL, is one of the many associated with the adventurous king. He also appears prominently in Scott's *Talisman.* Richard returned to England in 1194, but did not take up the active administration of state affairs. Instead, he left the government to the care of a trusted minister and himself engaged in a war with Philip Augustus of France. In 1199 he was killed during the siege of a French castle, and was succeeded by his brother John. During his entire reign Richard spent less than one year in England. Though a brave and accomplished man, he performed not one service for the good of his country.

Richard II (1367-1400) was ten years old when he succeeded his grandfather, Edward III. Richard was the second son of the Black Prince, and the nephew of John of Gaunt. The latter became the real ruler, and so heavily did he tax the people that a rebellion under Wat Tyler broke out in 1381. In quelling this insurrection the boy king showed considerable spirit and courage. Wars and intrigues disturbed the rest of Richard's reign, and in 1399 he abdicated. The immediate cause of this event was his confiscation of the estates of his cousin, the Duke of Hereford, eldest son of John of Gaunt. Hereford raised an army against Richard and forced him to resign the crown, and it is supposed that he later had him put to death. During the reign of Richard, Chaucer wrote his *Canterbury Tales* (which see) and Wycliffe made a translation of the Bible. Important political movements were the development of the Privy Council and an increase in the activity of Parliament. The Duke of Hereford succeeded to the throne as Henry IV (see HENRY, subhead *Henry IV,* page 2770).

Richard III (1452-1485), the youngest son of Richard, Duke of York, succeeded to the throne in 1483. His reign was brief and troubled, for he represented one of the two rival houses—Lancaster and York—whose struggles for the crown made up the annals of the Wars of the Roses. When, in 1483, Edward IV died, his little son became king as Edward V. This child was left to the care of his uncle, Richard, Duke of Gloucester, who became Protector of the kingdom. Soon after this, Richard began plotting for the kingship. He had the most powerful relatives of the queen mother arrested and beheaded, the boy king and his young brother were placed in the Tower, and an ignoble Parliament declared the Protector the rightful king. A crown so gained could not be securely held, and the king was soon threatened by plots for the rescue of the imprisoned children. Richard probably tried to offset these plots by having the young princes murdered; at least the evidence points to his guilt in this cruel scheme. At all events the people looked upon him as the murderer of his nephews, and a general uprising in favor of the House of Lancaster quickly took form. On Bosworth Field, in 1485, Richard's forces were defeated by an army under the Earl of Richmond, who became king as Henry VII. Richard himself was slain in the battle. For a striking though exaggerated view of Richard's character the reader should study Shakespeare's great historical play, *King Richard III.*

Consult Archer's *Crusade of Richard I;* Vickers' *England in the Later Middle Ages;* Markham's *Richard III: His Life and Character.*

Related Subjects. The following articles in these volumes give added information on the periods covered by these reigns:

Blondel
Crusades, subhead *The Third Crusade*
Edward, the Black Prince
Plantagenet
Roses, Wars of the
Tyler, Wat

RICHARDSON, JOHN (1796-1852), a Canadian soldier and novelist, best known as the author of *Wacousta, or The Prophecy,* an exciting tale dealing with the siege of Detroit by the Indians under Pontiac. Richardson was born near Niagara Falls, Ont. During the War of 1812, though still a boy in his teens, he fought as a volunteer until his capture at the Battle of the Thames. After his release he joined the British army, and eventually rose to the rank of major. In 1835 he fought for the queen regent against the Carlists in Spain, but in 1838 returned to Canada as a special correspondent for the London *Times.* In 1840 he founded at Brockville a paper called *The New Era,* and later for two years edited the Kingston *Native Canadian.* The last years of his life were spent in the United States in newspaper work. In addition to *Wacousta* he wrote *Ecarté, or the Salons of Paris; The Canadian Brothers; War of 1812; Eight Years in Canada,* and *Tecumseh.*

RICHARDSON, SAMUEL (1689-1761), the first of the great English novelists. He was born in Derbyshire, where he received an elementary education. In his sixteenth year he went to London and became apprenticed to a printer, and after several years of service, in which he proved himself an industrious and careful worker, he went into business for himself. In this occupation he continued until 1739, when he was engaged by two booksellers to prepare a collection of letters which might serve as models for uninstructed people.

Richardson was a letter writer of some experience, for in his boyhood he had carried on correspondence for several Derbyshire young women. With a desire to make the proposed work interesting as well as useful, he represented several persons as exchanging letters which formed a complete narrative. Thus his first novel, *Pamela,* was written. Its popularity was great and immediate, and *Clarissa Harlowe,* his greatest work, published eight years later, met with an even more enthusiastic reception. Late in his life appeared *Sir Charles Grandison,* which dealt with fashionable life, as *Pamela* had dealt with the lowest and *Clarissa Harlowe* with the middle class. The fact that they were written in the form of letters made these novels of Richardson very long, and at times tiresome and overburdened with detail, but it gave the author an opportunity to show his wonderful power of portraying character. In the analysis of the finer shades of a woman's emotions and thoughts, he has never been surpassed.

RICHELIEU, *re sheh lyu',* or *reesh' e loo,* ARMAND JEAN DU PLESSIS, Duke de, Cardinal (1585-1642), a distinguished French statesman, for eighteen years practically the absolute ruler of France. He was born in Paris and prepared to enter the army, but later turned to the Church and in 1607 was consecrated Bishop of Lucon. In this office he proved zealous and able.

CARDINAL RICHELIEU
He used questionable means to gain his ends, which he believed to be for the good of his country. He developed France, but he also developed an absolutism in government which led eventually to autocracy's downfall.

However, he had political ambitions, and when in 1614 he was sent to the States-General as a representative of the clergy, he managed to win the favor of Maria de' Medici, mother of King Louis XIII, and through her to gain a position at court. In 1616 he was promoted to the secretaryship for war and foreign affairs, but in the following year, when the queen mother fell into disfavor, Richelieu, too, was banished from court.

Most Powerful Man in France. The reconciliation of the king and his mother was largely the work of Richelieu, who as a reward was raised to the rank of a cardinal. Recalled in 1624 to the royal council and made minister of state, he found himself the strongest man in France and a factor to be reckoned with in the affairs of Europe. France was disturbed at home by the political ambitions of the Huguenots and the lawlessness of the great nobles, and threatened abroad by the power of the Austrian House of Hapsburg; Richelieu's policy, adhered to throughout his life, sought, among other things, to remedy these conditions. He was not religiously intolerant and made no attempt to take away the freedom of worship

from the Huguenots, but he led in person the army in the siege of their stronghold, Rochelle, which submitted to him in 1628. The great nobles, too, were forced to surrender many of the powers which had for generations weakened the central government, and thus he made the king an absolute ruler.

His Influence in Europe. Richelieu's greatest achievements, however, were in foreign affairs, for he did much to restore to France the prestige which it had had in the days of Henry IV. Despite his attitude toward French Protestantism he threw his influence on the side of the Protestants in Germany, and induced Gustavus Adolphus to come forward as their champion in the Thirty Years' War. The full results of his policy for the humiliation of Spain and Austria he did not live to see.

Throughout all his years of power Richelieu had to contend against the personal dislike of the king, who retained him in office only because he dared not, for the sake of the country, dismiss him. Although sometimes unscrupulous in his methods, Richelieu always placed his country's good before his own, and in that sense proved himself a true patriot, though his policy did not in the end work to the greatest good of France. One of his most lasting services was the founding of the French Academy. A.MC C.

Consult Perkins' *Richelieu and the Growth of French Power.*

Related Subjects. The reader is referred to the following articles in these volumes:

Academy	Louis, subhead
France, subtitle *History*	*Louis XIII*
Huguenots	States-General

RICHELIEU RIVER, a Canadian stream, the outlet of Lake Champlain into the Saint Lawrence River. The Richelieu is also known as the Chambly, Saint John or Sorel River. Emerging from Lake Champlain, about six miles north of the United States boundary, the Richelieu flows almost directly northward for eighty miles to the Saint Lawrence, which it reaches at Sorel, midway between Montreal and Three Rivers. The Richelieu varies from a thousand to eight thousand feet in width. It flows through a picturesque section, which has added charm through its many historical associations. It is navigable from Sorel southward to Chambly; from there a canal to Saint John makes it possible to avoid the rapids. These three towns are the principal settlements on the river.

RICHMOND, *rich'mund,* IND., the county seat of Wayne County, situated on the Whitewater River, three miles from the Ohio state line and sixty-nine miles east of Indianapolis. Transportation is provided by the Pennsylvania, the Grand Rapids & Indiana and the Chesapeake & Ohio railroads, and by the Dayton & Western and the Ohio traction lines. The place was settled in 1816 by a community of Quakers from North Carolina. It was incorporated in 1834 and was chartered as a city in 1840. In 1910 the population was 22,324; it had increased to 26,728 in 1920, a gain of 20 per cent. The city has an area of four square miles.

Richmond is the commercial center for the greater part of Wayne County, a rich agricultural district. There were in 1920 144 manufacturing establishments, capitalized at $14,215,000. Important manufactures include Davis motor cars, office furniture, kitchen cabinets, lawn mowers and a variety of tools. Among noteworthy buildings in the city are the Federal building, erected in 1908 at a cost of $100,000, the $150,000 Reid Memorial Hospital and the $225,000 Reid Memorial Church. Richmond has Earlham College, established in 1847 under the direction of the Orthodox Friends, Morrison Reeves Library, with 30,000 volumes, and the Richmond Law Library. The Eastern Indiana Hospital for the Insane is located here, and there are homes for the friendless, the aged and the orphaned. Glen Miller Park (150 acres) is the largest of the park reservations, which cover about 300 acres. The annual convention of the Orthodox Friends of Indiana is held in the city.

RICHMOND, VA., the capital and largest city of the state, a port of entry and the county seat of Henrico County. It is one of the old, influential cities of the South, and played an important rôle in shaping and controlling the early destinies of the United States. During the War of Secession it was the capital of the Confederacy. It is situated south and east of the geographical center of the state, on the north and east banks of the James River, along a southward bend in the course of the stream, and at the head of tide water, ninety miles west of Chesapeake Bay. Washington, D. C., is 116 miles northeast. Steamer transportation to ports of the Atlantic coast is furnished by the Old Dominion, Virginia Navigation and Chesapeake lines, and railroad transportation by the Atlantic Coast Line, the Chesapeake & Ohio, the Richmond, Fredericksburg & Potomac, the Seaboard Air Line and the Southern roads. There was an increase in population from 127,629 to 171,667 (Federal census) be-

tween 1910 and 1920. The area of the city is over twenty square miles.

Situation and Parks. *Modern Rome,* as Richmond has been called, is a name suggested by the city's location upon hills (the original number was seven), which rise in terracelike formations from the river to an elevation of 250 feet above sea level. The higher points afford beautiful views of the river, with its many islands and bridges. The public parks contain 639 acres; Bryan Park, 263 acres, and William Byrd Park, 300 acres, are the largest. Gamble's Hill Park has an especially fine outlook; in the river below is Belle Isle, the site of the Old Dominion Iron and Nail Works, once used as a Federal prison; and from here also may be seen the famous Tredegar works, the principal iron foundry in the city, established during the War of Secession. In this factory cannon were made for the Confederacy. Libby Park extends from Main Street to the summit of Libby Hill, where stands a splendid monument to Confederate soldiers and sailors. Monroe, Jefferson and Marshall are smaller parks. Chimborazo, a park of thirty acres, was once the site of a Confederate hospital, and from here one of the city's finest roads extends five miles southeast to the National Cemetery, at Seven Pines.

Cemeteries. One of the city's favorite drives leads to Hollywood, where 18,000 Confederate soldiers lie buried, and here, erected to their memory, is a granite pyramid ninety feet high, partly covered by Virginia creeper and ivy. Here are the graves of some of Virginia's most illustrious dead, among them John Tyler, James Monroe, John Randolph, Jefferson Davis and many Confederate generals. In Oakwood, northeast of the city, are several thousand Confederate graves. Richmond has also Shockoe Hill (the oldest) and Riverview and Mount Calvary cemeteries. In the National Cemetery are 6,553 graves of Union soldiers who lost their lives in the struggles about Richmond. Of these graves, 5,700 are burial places of the unknown dead.

Public Buildings. Historic associations, even more than architectural merit, distinguish the prominent buildings of Richmond. In the heart of the city, on Shockoe Hill, stands the state capitol, surrounded by Capitol Square Park, twelve acres in extent. Thomas Jefferson, while minister to France, secured the model and plans for this building, which were designed from an ancient Roman temple, the Maison Carrée, at Nîmes. The structure was begun in 1785 and was four years in building. Some consistent remodeling, including the addition of east and west wings, was accomplished as the result of a state appropriation made in 1903. The original model is preserved. The building contains Houdon's marble statue of George Washington and a bust of Lafayette by the same sculptor. Saint John's Episcopal Church, built in 1740 and later enlarged, is still used for religious services. In the old churchyard which surrounds the building is the grave of George Wythe, one of those who signed the Declaration of Independence. In Saint John's Church, in 1775, at the Virginia Convention which met to hear the report of the first Continental Congress, Patrick Henry made his stirring speech including the famous words: "Is life so dear, or peace so sweet, as to be purchased at the price of chains and slavery?"

The oldest building in the city, known as the Stone House, was erected in 1737. It was first a dwelling, and is now used as a historic museum. The home of General Lee's family during the war, now occupied by the Virginia Historical Society; the home of Jefferson Davis while President of the Confederacy, and the old home of Chief Justice Marshall are among the city's treasures. On Broad Street stands Monumental Church, on the site of a large, wooden building in which the Constitution, framed at Philadelphia, was ratified by Virginia. In the Valentine Museum, the house in which Aaron Burr dwelt while on trial in Richmond for treason, is a fine collection of historic relics, paintings and statuary.

In Capitol Square are the executive mansion, the state library and the old Bell House. Facing the Square is the finest modern structure in Richmond, the city hall. It is built of granite and cost about $1,400,000. The Masonic Temple (built in 1785), the Chamber of Commerce, Sacred Heart Cathedral, Union Depot, the soldiers' home and the state penitentiary are other prominent buildings.

Monuments. Perhaps no American city has finer public monuments than Richmond. Two of the most noteworthy are equestrian statues of George Washington and Robert E. Lee. The first, designed by Thomas Crawford, stands in Capitol Square. The second, designed by the French sculptor Mercie, is in Lee Circle, and represents Lee on his favorite war horse, "Traveller." At the western limit of beautiful Monument Avenue is a fine Jefferson Davis monument, and at the eastern limit is the equestrian statue of General J. E. B. Stuart. The How-

itzer monument, and statues of Henry Clay, Stonewall Jackson and Hunter H. McGuire, a famous Virginia surgeon, are also noteworthy.

Institutions. Richmond is the seat of Richmond College, the Union Theological Seminary of Virginia (Presbyterian) and the Medical College of Virginia. Institutions for colored students are the Virginia Union University (Baptist), and, beyond the city limits, the Hartshorn Memorial College. The Mechanics Institute and private and normal schools supplement the public school system. Richmond has the state library, the Rosemary Library, a gift to the city from Thomas Nelson Page in honor of his wife, the state law library, public library and Virginia Historical Society Library. There are homes for aged and orphans, and among the principal hospitals are Saint Luke's, Grace, Memorial and the Stuart Circle.

Industry. Richmond is the leading industrial center in the state, with an annual output of goods valued at over $98,000,000. Abundant power for manufacture is created by cascades in the James River, by which the stream descends 100 feet in six miles. A canal around the cascades also furnishes water power. Richmond is one of the principal tobacco markets and manufacturing centers of the United States. The establishments engaged in this industry include stemmeries, packing houses, smoking and chewing tobacco factories, cigar and cigarette factories. Iron manufacturing is also extensive, and is represented by foundries and machine shops, locomotive works, car-axle and railroad-spike works and manufactories of farming implements, horseshoes and nails. Other manufactured products are fertilizers, flour, lumber and lumber products, paper, twine, baking powder, trunks and bats. The wholesale and jobbing interests of the city are important.

History. Captain John Smith, the leader of the Jamestown colony, bought from the Indians a tract of land near the present site of Richmond in 1609. He called the place "None Such." His attempt to colonize was not successful. Fort Charles was built near the falls in the river in 1645. Colonel William Byrd obtained grants of land in the vicinity in 1675 and 1687, and in 1733 his son, Colonel William Byrd, established the town of Richmond. It was incorporated by the assembly of Virginia in 1742, and in 1779 the state capital was removed from Williamsburg to Richmond. In 1782 a city charter was obtained. In 1861 the Act of Secession was adopted, and the city was the capital of the Confederacy from May, 1861, to April, 1865. Its capture was for years the chief aim of the North. From 1862 to 1865, when it surrendered, Richmond was almost continuously besieged; fifteen pitched battles and more than twenty skirmishes were fought in the attempt to capture it. Upon the eve of the evacuation, on April 2, 1865, General Ewell gave orders to the retreating army to fire the tobacco warehouses, arsenals and bridges.

Consult Powell's *Historic Towns of the Southern States.*

RICHTER, *riK'ter,* Johann Paul Friedrich, "Jean Paul" (1763-1825), the most famous German humorist and satirist, was born at Wunsiedel, Franconia. In early youth left penniless by the death of his father, he struggled desperately for an education, studied at Leipzig, and about 1782 attempted to enter the literary field. The following year his *Greenland Lawsuits* satirized several classes of society, but attracted little attention, and, rather discouraged, he spent the next three years in miscellaneous writing and aimless wandering. For a time he taught a private school, and, while depending on this for a living, wrote such clever satirical works as *Extracts from the Devil's Papers;* a romance, *The Invisible Lodge; Schoolmaster Wuz; Quintus Fixlein* and *Hesperus. The Invisible Lodge* gained wide notice, while *Hesperus* attracted to him the influential Charlotte von Kalb, who introduced him to Goethe and Schiller. In his last years, spent at Bayreuth, he turned his mind toward pedagogical problems and made valuable contributions to the subject through his *Levana* and *Introduction to Aesthetics.*

Richter was a brilliant, but unreliable, writer. A mere suggestion could open a multitude of ideas to him, but he scarcely completed any task. His satire, especially when dealing with political subjects, was bold and unrelenting. Doubtless his most valuable works for modern readers are his *Levana,* full of fruitful hints as to the education of women and young children, and his book on aesthetics, containing a keen analysis of wit and humor.

RICKETS, *rik'ets,* a disease of childhood of which the most important feature is softening of the bones. It is caused by lack of proper nourishment. The symptoms are sometimes noticed in children a few days old, but they develop most frequently between the ages of one and two. The bones, because of a deficiency of lime salts, undergo extraordinary changes. Enlargements appear at the ends of the ribs and at the elbows, wrists, knees and

ankles. The weak legs become bowed, the skull bulges out, the spine bends forward or sideways, and the child becomes "chicken-breasted." Soft spots in the head may fail to close for months beyond the natural time. The bones become so tender that even gentle handling of the child causes it pain, and at night it is restless and perspires profusely. Unless the disease is checked permanent deformities may result. As soon as the symptoms are noticed a child with rickets should be placed in the care of a physician. Dieting and attention to hygienic rules must be carefully observed. Proper nourishment, fresh air and clean and suitable clothing are the best aids to recovery. The standard medicine for cases of rickets is cod-liver oil, and in some instances physicians may prescribe phosphorus and other tonics.

RIDEAU, *re doh',* **CANAL,** sometimes called the OTTAWA-RIDEAU CANAL, is a Canadian waterway extending from Kingston, on Lake Ontario, to Ottawa, on the Ottawa River. From Ottawa vessels can proceed down the Ottawa River to Montreal; thus the system provides a waterway between Montreal and Lake Ontario and avoids the rapids of the Saint Lawrence River (see map, page 1110). The distance between Montreal and Kingston by this route is 246 miles. When the Rideau Canal was begun, in 1826, this connection was of vital military importance, but the subsequent construction of railways destroyed its military value. It maintained its commercial importance, however, for years, and is still used extensively, although chiefly for local traffic.

The Rideau Canal was completed in 1832, and the first vessel passed through on May 29 of that year. It was built under the direction of Colonel John By, the British officer who founded Ottawa (which see, subhead *History*). The cost of construction was a little more than $4,000,000. The canal is 126 miles long, has a navigable depth of four and one-half feet, and includes forty-seven locks, each 134 feet long by thirty-three feet wide. A considerable portion of the Rideau system is canalized lake and river, beginning with the Cataraqui River at Kingston; farther north is Rideau Lake, from which the Rideau River flows into the Ottawa River at Ottawa.

Strictly considered, the Rideau Canal is the waterway from Ottawa to Kingston. The Ottawa Canals include three features, the Grenville and Carillon canals and the Saint Anne Lock, all on the Ottawa River and constructed to perfect the water connection between Ottawa and Montreal. The Saint Anne Lock cost $1,170,000; and the Grenville and Carillon canals, which are usually regarded as one canal, cost $4,000,000. The locks on this system are 200 feet long by forty-five feet wide. The traffic through the combined Ottawa-Rideau system is about 500,000 tons a year, of which one-half is the product of mines and more than one-third is lumber. Of the total traffic the Rideau Canal carries only 150,000 tons, the balance being between Montreal and Ottawa. There is practically no passenger traffic on the canals, although in recent years an increasing number of motor boats use certain parts of the waterway for short pleasure trips.

RIDGWAY, *rij'wa,* ROBERT (1850-), a leading American ornithologist, was born at Mount Carmel, Ill. From his boyhood he showed a remarkably intelligent interest in natural history, and when but seventeen years of age was zoölogist to the Clarence King geographical exploration of the fortieth parallel. In 1880 he became curator of the bird department in the National Museum at Washington, a post which he has retained ever since; and in 1883 he helped to found the American Ornithologists' Union, of which he later became president. He wrote *A Nomenclature of Colors for Naturalists,* a *Manual of North American Birds* and *The Birds of North and Middle America,* this last his chief work. It appeared in eight volumes, and ranks as one of the most important works on ornithology ever written, though very technical in form.

RIDING, *ride'ing,* when used in the sense of horsemanship, is a term which defines the art of keeping an easy and graceful seat on the back of a horse. Different peoples ride in different ways, and consequently have different standards of excellence; but it is generally admitted that the Cossacks of the Russian steppes, the wandering horsemen of Arabia and the cowboys of North America are among the world's most wonderful riders. The Cossacks and the cowboy are noted, in particular, for the ease with which they follow the rhythm of the horse's movements, so as almost to become a part of his body. Poise and constant practice are required for such riding.

The horse has naturally three paces—the walk, the trot and the canter, or gallop. A so-called "gaited" horse has been broken to still other paces, more comfortable for the rider, but the expert horseman adapts himself easily to any gait. He sits upright in the saddle,

gripping the leather firmly with his thighs. The leg below the knee hangs free and the boot-heel is usually equipped with a spur for use on the horse's flank. The feet, with the balls in the stirrup, should be held parallel with the sides of the mount, the heels a little depressed. The reins are held in one hand by a practiced rider, but the novice will do well to keep a rein in either hand until he has learned to guide his horse without taking much thought. In the walk and the canter, the art of riding consists in yielding to the horse's motion and falling in with the rhythm of his body; in the trot, the English habit of rising lightly in the saddle in time to the motion of the horse is now generally practiced.

Benefits. Horseback riding develops muscular control, courage and self-possession. It keeps one in the open air, and subjects the muscles to a light but constant exercise that is in the highest degree beneficial to health. Such finished athletes as the Greeks and the Romans of the ancient world were expert riders; the knights of the feudal period excelled in horsemanship. The present decay of horseback riding has deprived man of one of his most invigorating exercises.

RIDLEY, *rid'li,* Nicholas (about 1500-1555), an English churchman, one of the early martyrs to the reformed faith. He was graduated at Pembroke Hall, Cambridge, studied in Paris and at the University of Louvain, and after his return to England attracted the attention of Archbishop Cranmer, who made him one of his own chaplains and later chaplain to Henry VIII. He speedily became one of the leaders in the Protestant movement, and under Edward VI acquired great influence.

In 1547 he was created bishop of Rochester and in 1550 bishop of London; as a result of this promotion he was appointed to assist in revising the English prayer book and drawing up the Thirty-nine Articles. As an adherent of the Protestant side he favored the claims of Lady Jane Grey to the throne, and as a consequence found himself in a dangerous position on the accession of the Catholic Mary. In 1553 he was arrested, in the next year was brought to trial, and in 1555 was found guilty of heresy and burnt at the stake.

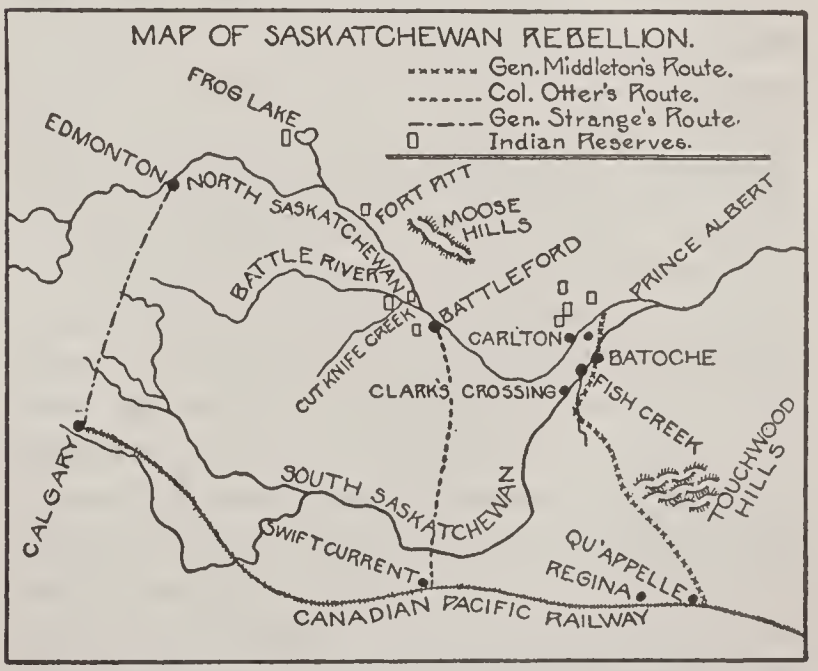
Related Subjects. Ridley's life will be more fully explained and the time in which he lived will be better understood by reference to the following articles in these volumes:

Boleyn, Anne	Reformation, The
Catharine of Aragon	Wolsey, Thomas
Cromwell, Thomas	Henry VIII

RID'PATH, John Clark (1841-1900), an American historian, born in Putnam County, Ind. He graduated from Asbury University, now De Pauw University, at Greencastle, Ind., was professor in Baker University, Baldwin City, Kan., for a time, and was then appointed to the chair of English in Asbury. He was later made vice-president of the institution, and it was chiefly through his efforts that the school secured an endowment of two million dollars and had its name changed to De Pauw University. He wrote a number of historical works which are somewhat popular in style but authoritative in content. His *Life of James A. Garfield* and *Life and Times of Gladstone* are worthy of mention, but his best-known production is the *History of the United States,* in eight volumes, which appeared the year of his death. It has had a phenomenal sale, due to the great popularity of the author.

RIEL, *reel* or *re'el,* Louis (1844-1885), a Canadian agitator, leader of two rebellions against the Dominion government. Riel voiced the protest of the half-breed and of all the great West against the entrance of civilization. Riel wanted to keep it as a frontier. A man of great personal magnetism, brilliant, eloquent, he is nevertheless a pathetic figure in Canadian history. He is usually called a half-breed, although in reality the Indian strain was once removed, for he was the son of a white man and a half-breed mother.

Riel was born at Saint Boniface, Man. He is said to have been educated for the priest-



SCENES OF THE RIEL REBELLION

hood at Quebec, but it is certain that he did not take orders. Between 1866 and 1868 he worked at various occupations in Minnesota, but he was not a conspicuous figure until 1869, when he led the Red River Rebellion (which

see). Riel was only secretary, and one John Bruce was president, of a council elected by the métis to insist on their rights, but Riel was the real head of the movement, and was later elected president of the "provisional government." When it was evident that the rebellion was a failure, Riel fled to the United States, where he remained for several years. In 1873 and again in 1874 he was elected to the House of Commons as member for Provencher. In the latter year, although there was a reward of $5,000 still standing for his capture, he actually attempted to take his seat. The Commons, however, expelled him, and in February, 1875, he was declared an outlaw.

For the next nine years Riel kept out of the public eye. In 1877 he was held for a time in an insane asylum in Quebec, but in the next year he was at large again, and there is some evidence that he was negotiating with the Fenians to lead an invasion of the Northwest. He then lived in Montana for five years, and from there was called by the French half-breeds, who had moved westward and were living on the Saskatchewan River, to help them win certain demands from the government. Here again, in March, 1885, Riel was elected president of the provisional government, whose headquarters were at Saint Laurent. The provisional government had a short existence (see Saskatchewan Rebellion), and Riel was captured and tried for high treason. His lawyers pleaded that he was insane, a plea which had numerous facts to sustain it; but Riel was nevertheless condemned to death, and was hanged on November 16, 1885. W.F.Z.

Consult Begg's *History of the Northwest;* Bryce's *Manitoba.*

RIENZI, *ri en'ze,* Cola di (about 1313-1354), a tribune of the Roman people. He was born in Rome, and received an education which included much study of the history of Rome in the days of its splendor. This had a strong effect on him, and his desire to free the city from oppression at the hands of its aristocratic governors was intensified by his wish to avenge the death of his brother, who had been slain by a noble. The rulers of the city hated and feared him, but the Pope gave him his support, and by 1347 Rienzi was strong enough to call a meeting of the people on the Capitol and propose the adoption of a new form of government. New laws were drawn up and Rienzi was made tribune, with practically unlimited power, while the nobles left the city with no attempt at opposition.

At first he ruled justly, if sternly, and widespread approval of his acts was expressed; but his absurd ceremonials, together with his increasingly autocratic assumption of power, brought upon him ridicule and destroyed the confidence of the people in his disinterestedness, so that by the end of 1347 he was obliged to flee from Rome. For two years he lived in a monastery, and at the close of that time sought to induce Charles IV to take up the work of delivering Rome. Charles refused his request, put him in prison, and a year later gave him up to Pope Clement, who kept him imprisoned at Avignon. When Innocent VI became Pope in 1352 he released Rienzi and sent him on a mission to Rome. The people received him with enthusiasm and he was able within a few days to regain his lost power, but cruel and arbitrary acts on his part enraged the people and in October, 1354, a disturbance arose, during which he was killed. Bulwer-Lytton's *The Last of the Tribunes* deals with Rienzi's life, as does Wagner's *Rienzi.*

RIESENGEBIRGE, *re'zen geh bir'ge,* which means *giant mountains,* is a range forming the middle and highest part of the Sudetic mountain range in Europe, dividing Prussian Silesia and Lausitz from Bohemia. They are formed chiefly of granite, porphyry, mica schist and gneiss, and contain beds of coal, basalt and other minerals. The highest point is the Schneekoppe (Snow-Peak), which is 5,265 feet above the sea. The whole range is covered with giant pine trees and is ruggedly beautiful.

RIETSCHEL, *re'chel,* Ernst (1804-1861), a German sculptor who won enduring fame because of his ability to delineate character in portrait statues. He was born at Pulsnitz, Saxony, studied art at the Dresden Academy, and later became a pupil of Christian Rauch (which see). He was appointed professor at the Dresden Academy in 1832, after a trip to Italy, holding this post until his death. His statue of *King Frederick Augustus of Saxony* was finished when he was only twenty-seven years old. His best character portrayal is shown in the statues of *Lessing* at Brunswick, *Luther* at Worms, and the magnificent *Goethe-Schiller Monument* at Weimar. His execution of the figure of Weber at Dresden is superb because of its delicate simplicity. His deep religious feeling is manifested in the group, *Virgin and Dead Christ,* which was executed for the Friedenskirche (Church of Peace) at Potsdam. Of his statues of Luther and Lessing, which are considered his best productions, Lubke says;

"He has produced with imperishable power, in monumental form, the intellectual and moral ideals of the nation, in the persons of their noblest representatives."

RIFLE, *ri'f'l,* the principal weapon of all modern armies. It was invented in Germany in 1498, and was first used for military purposes in 1630. A rifle is practically a musket, with certain improvements, the chief of which is the "rifling," or spiral grooving in the interior of the barrel. This grooving gives a rotary motion to the bullet fired and lessens its tendency to depart from a straight line. The grooves, or corkscrewlike twists, vary considerably in different patterns, old rifles showing from a half or three-quarter turn to one complete turn in two to three feet of barrel length. The introduction of rifled barrels and modern ammunition has increased the effective range of rifles from about 200 or 300 yards to considerably over a mile.

The value of rifles was demonstrated in the Revolutionary War in America more than in any previous conflicts, and from that time the rifled barrel has been regarded as essential. In 1851 appeared the first rifle firing an elongated bullet instead of a round metal ball. It was called the *Minie,* after its inventor of that name, who was awarded $100,000 for his invention by the French government. The Minie rifle, weighing, with a bayonet attached, 10 lbs. 8¾ oz., was used in the Crimean War (1854). It fired a charge of 2½ drams of powder and was sighted from 100 to 1,000 yards.

Between 1857 and 1861 Sharp's, Green's, Westly Richards' and Terry's breech-loading guns were introduced. In these rifles the breech was closed by a block which contained a striker, or piston; when the striker was released by a spring it struck the cartridge and exploded the charge by percussion. Sharp and Spencer carbines and rifles were used by the Federal troops in the War of Secession, but the universal adoption of the breech loading dates from 1867.

Breech loading, combined with rifling, had greatly added to the efficiency of armies, but still further improvements were sought to insure quicker firing. This led to the introduction of the magazine principle. The Winchester was one of the earliest magazine rifles, and was used with great effect in the Russian-Turkish War of 1877. In the Winchester rifle the cartridges were loaded into a tube under the barrel and were forced into the chamber by the action of a lever.

Germany was the first world power to arm all its troops with a magazine rifle, converting the older pattern rifle then used, the 1871 Mauser, into a magazine rifle by addition of a tube beneath the barrel, as in the Winchester. The tube magazine was suspended by the box magazine behind and below the chamber. In these magazines the cartridges are forced in and out of the chamber by the bolt which opens and closes the breech. This principle is embodied in the rifles used by all modern armies.

The United States army up to 1904 was armed with the Krag-Jorgensen, which was then superseded by the Springfield rifle. The Springfield rifle barrel has four grooves and a caliber of 0.30; the rifling in the barrel makes one turn in eight inches of barrel length. A charge of 44.5 grains of smokeless powder is fired. The bullet is steel-jacketed, covering a core of lead, and weighs 44.5 grains. Wounds inflicted by modern bullets are more easily healed than were those caused by the bullets of former weapons. The rifling of the barrel and the high velocity of the projectile give the bullet a steady course and it leaves merely a small hole which if no vital organs are touched causes only temporary disablement. These bullets are effective at ranges up to 4,000 yards, but accurate shooting cannot be obtained at that range. At a distance of 1,500 yards a modern bullet will penetrate six human bodies, one behind another. So-called mushroom, or "dumdum," bullets have slight penetrating power. They expand on striking and often remain in the body struck.

The rifles used by European armies differ only in details of weight and length from the Springfield rifle, the principles of action, loading and firing being practically the same. The Springfield magazine is below the breech mechanism, and is loaded with five cartridges from a metal clip. Between the magazine and the breech is a "cut off," or piece of metal which closes the magazine and allows the rifle to be used as a single-firer, loaded by hand at the breech. This makes it possible to keep a full magazine ready for immediate use when quick fire is essential.

The Lee Enfield and Lee Metford, used by the British army, have magazines holding ten cartridges, the Mauser and Mannlicher of continental armies are loaded with a clip of five cartridges. The Mauser rifle is not provided with a cut off between the magazine and the breech, but has a safety which prevents accidental discharge; it is considered the simplest

in mechanism of all magazine rifles and is effective at long ranges. The Boers of South Africa used the Mauser in the war of 1899-1902 with great effect, and the Mauser now used by the German army differs only in minor details from the pattern then used. F.ST.A.

Consult Ommundsen and Robinson's *Rifles and Ammunition;* Askins' *Rifles and Rifle Shooting.*

Related Subjects. The reader is referred to list of articles in these volumes at end of article ARMY, page 385.

RIGA, *re'gah,* for year second to Petrograd among the Russian seaports along the Baltic, is now the capital of the new republic of Latvia. It lies on the Düna River, about ten miles above the point where that stream empties into the Gulf of Riga (see colored map of Europe, following page 2092). The river has been canalized from the city to the sea, and is navigable that distance for small boats; large ocean steamers dock at the outer port of Ust-Dvinsk, at the mouth of the river. The chief disadvantage with which shipping must contend is the fact that the harbor freezes over about 127 days every year. Riga has excellent railroad communication with Southern Russia; water communication with the regions along the Dnieper and the Volga is afforded by a system of canals. Cereals, hides, skins and lumber are included among the exports, and foodstuffs, coal and manufactured goods make up the imports. The city has a large number of manufacturing plants, the yearly output of which approximates $30,000,000.

Founded in 1201, Riga early attracted many German settlers because of liberal regulations in regard to trade. It still has a large German population, and the old portion of the city looks much like a typical German town of the Middle Ages. In the suburbs, where the residential districts are found, the houses are modern. Among numerous educational institutions are a polytechnical institute, a navigation school, a library with about 100,000 volumes, and a city museum. Because it is the key to the occupation of Petrograd, Riga has suffered siege in various wars; it was shelled by the Germans in 1915, and was captured by German troops, in September, 1917. They were compelled to abandon the city after the war. See WAR OF THE NATIONS. Population in 1920, 185,137.

RIGA, or **LIVONIA,** GULF OF, an inlet of the Baltic Sea, about 100 miles long and seventy miles wide (see colored map of Europe, facing page 2097). The gulf never entirely freezes over, and along the coast the waters are navigable for nine months of the year. The Düna, on which the city of Riga (see above) is situated, is the largest river opening into the gulf.

RIGGS, KATE DOUGLAS WIGGIN (1859-), an American novelist and writer of juvenile fiction, was born at Philadelphia, Pa. She was educated at Abbot Academy, Andover, Mass., and at the age of eighteen went to Los Angeles, Cal., to teach. In 1878 she founded at San Francisco the first free kindergarten on the Pacific coast and two years later established in that city the California Kindergarten Training School. It was while engaged in this work that she began her highly successful writing of stories for children. Her first book, *The Birds' Christmas Carol,* appeared in 1888, and seems to have increased in popularity year by year. Among her other stories for young readers should be mentioned *The Story of Patsy, Marm Lisa* and *Timothy's Quest,* a book that made a very strong appeal to children. All these books were written for children, but in 1902 she began to tell mature readers about children, in such delightful stories as *The Diary of a Goose Girl, Rebecca of Sunnybrook Farm, Rose o' the River* and *New Chronicles of Rebecca.* Mrs. Riggs has homes in New York and in Maine.

Few authors have understood child life more accurately than Mrs. Riggs or have written about it with more sympathy and enthusiasm. She has therefore made notable contributions to juvenile education and literature in America. Her books have the rare quality of not "talking down" to children, but instead they meet the juvenile mind on its own level. The result is a form of literature that really leaves a definite impression upon the child reader. It was her original idea that teachers should be trained for kindergarten work.

RIGHT OF WAY. See EASEMENT.

RIIS, *rees,* JACOB AUGUST (1849-1914), an American journalist, author and social worker, who was once called "America's most useful citizen," was born at Ribe, Denmark. At the age of twenty-one, after studying at the Ribe Latin School, he emigrated to America, and for six years was glad to get various employments, such as construction camp work, carpentry, coal mining, farm work and peddling. In 1877, after suffering from actual poverty, he became reporter for the New York *Tribune,* and later police reporter for the *Sun,* and in this capacity grew thoroughly familiar with conditions in the city's poorer section. His endeavors to effect various reforms in the tenement houses and

schools were successful, and he became prominent in the movements for securing greater purity in the city water supply, parks in the congested districts of lower New York, and well-equipped playgrounds for the poor children.

Riis's friendship and sympathy were particularly extended towards the immigrants of the lower classes. He was executive officer of the Good Government clubs, and became secretary of the New York Small Parks Commission in 1897. After serving as reporter for twenty-seven years on various New York papers, he resigned and devoted his time to lecturing and writing. At the time of his death on May 26, 1914, at his summer home in Barre, Mass., he was generally recognized as among the foremost social workers of America. Among his writings are his famous *How the Other Half Lives,* a book for which he was at first unable to find a publisher; also *The Children of the Poor; The Making of an American* (his autobiography); *The Battle with the Slum; Children of the Tenements; Theodore Roosevelt, the Citizen; The Old Town* and *Hero Tales of the Far North.*

RILEY, *ri'li,* James Whitcomb (1853-1916), an American poet who is known to countless readers as the exponent of the common things of life. He was born in Greenfield, Ind., October 7, 1853. His father's profession, the law, did not appeal to him, and after receiving a common school education he worked for a time as a sign painter and then became a traveling actor. His spare hours he spent in composing songs and revising plays for the show company, and he gained an intimate knowledge of the country folk of Indiana, their dialect and their peculiarities, of which he later made good use. Becoming, in 1873, a reporter for the Indianapolis *Journal,* he began to contribute poems to that paper and others, signing them "Benjamin F. Johnson, of Boone." His dialect verses soon became very popular, and the "Hoosier Poet," as he was called, won a wide reputation. In 1877, by a clever literary hoax, he deceived editors and readers all over the country. He published in the Kokomo *Dispatch* a poem called *Leonainie,* which he signed "E. A. P.," and which a statement of the editor's declared to be a newly discovered poem by Poe. Even critics were interested, and not until the *Dispatch* itself explained the joke was the deception known.

For a time, with Edgar W. (Bill) Nye, Riley traveled about the country lecturing and reading from his poems, and his wonderful power of mimicry made him very successful in this. His first collection, *The Old Swimmin' Hole and 'Leven More Poems,* was followed by *Old-Fashioned Roses, Neighborly Poems, Rhymes of Childhood, An Old Sweetheart of Mine, Out to Old Aunt Mary's* and *A Child World.* The pathos and humor of these simple poems of

JAMES WHITCOMB RILEY
The best loved and most widely read poet of his generation.

Indiana life have made their appeal very general, and few poets of the present day have been so widely read. An intimate knowledge of child life, too, is shown in much of his work. Not everything which he has done has been in the Indiana dialect; he has written some beautiful selections in pure English.

In 1913, on his sixtieth birthday, a unique celebration was held in his home on Lockerbie Street, Indianapolis. Thousands of school children paraded before him, some of them carrying flowers, and the most prominent men of his state, as well as many of the poorer classes, visited him and did homage to his genius and his understanding love for nature and for humanity.

RIMOUSKI, *ree moos' kee,* the county town of Rimouski County, Quebec. It is on the south bank of the Saint Lawrence River, and on the Intercolonial Railway, 180 miles northeast of Quebec and 342 miles northeast of Montreal. It is the last port of call for outgoing transatlantic steamers on the Saint Lawrence.

Rimouski is the seat of a Roman Catholic bishop, and has a cathedral, seminary, monastery, three convents, a normal school and a commercial school. Being the county seat, it has the county courthouse and jail, and it also has customs and quarantine offices. Among its chief industrial establishments are saw and pulp mills, a sash-and-door factory and a flour mill. Lumbering, mixed farming and fishing are the resources of the neighborhood. Population in 1911, 3,097; in 1921, 3,612.

RIN'DERPEST, or **CATTLE PLAGUE,** an acute, infectious disease which attacks cattle and occasionally sheep. In Europe it has been a most serious plague since its appearance in the fourth century, but it is unknown in North America. Epidemics of rinderpest have swept from country to country in Europe, causing enormous losses. About ninety per cent of the animals attacked die, but if an animal survives, it is thenceforth immune. The source of infection is believed to be a minute organism or microbe (see BACTERIA AND BACTERIOLOGY), which may be carried in the manure or by sick animals or on the clothing of attendants. The disease shows itself by a high temperature and a rapid pulse. The milk supply stops. The next stage is marked by congestion of the mucous membranes of the mouth, throat, etc., and by the appearance of ulcers. Death is likely to ensue within four to seven days. No certain cure has as yet been discovered, but epidemics are held in check by inoculating healthy animals with a prepared serum. It is sometimes necessary, in order to wipe out the disease, to kill all infected and exposed animals.

RINE'HART, MARY ROBERTS (1876-), an American story-writer whose works are widely read for their humor and interesting plots. Her early novels were mystery stories, among them being *The Window at the White Cat, The Man in Lower Ten* and *The Circular Staircase.* Her later works, though still pervaded by an element of mystery, more nearly approach the character novel in type. Her novel, *When a Man Marries,* was unsuccessfully dramatized in the play called *Seven Days.*

MARY ROBERTS RINEHART

Mrs. Rinehart was born in Pittsburgh, Pa. She was educated in the grade and high schools of that city, and at the training school for nurses. In 1896 she was married to Dr. Stanley Marshall Rinehart. Mrs. Rinehart has taken an active part in the suffragist movement, and during the War of the Nations she served the American Red Cross in Europe.

Well-known works not mentioned above are *Where There's a Will, The Amazing Adventures of Letitia Carberry, The Street of Seven Stars, "K," Kings, Queens and Pawns* (impressions of the war in Europe) and *The Altar of Freedom. The Amazing Interlude* was published in 1918; in 1920 *Dangerous Days* appeared, and in 1921 she published *Sight Unseen and the Confession, The Truce of God, A Poor Wise Man* and *Affinities and Other Stories.*

RING, a band of gold or other precious metal, usually worn on the finger. The earliest known are those found in the tombs of ancient Egypt, though it is certain that the wearing of rings is as old as human history. The custom grew out of a love of ornamentation, but gradually took on a more significant aspect. Kings passed their rings to trusted servants, that they might have the full authority of the king himself. The signet ring with some distinctive device took the place of the purely ornamental ring. Pharaoh placed his signet ring on Joseph's finger when he set him over all Egypt, that all men might know that he held full kingly power (*Genesis* XLI, 42). The use of betrothal or engagement and wedding rings originated with the Jews. The wedding ring is worn on the third finger of the left hand because it was once popularly but erroneously supposed that a vein runs directly from that finger to the heart, and heart and hand are offered together.

In addition to an ornament, a ring has always been regarded as a symbol of authority, confidence and love, and still plays an important part in the coronation of kings and in the consecration of bishops. Among uncivilized people, such as many tribes in Africa and the islands of the Southern Ocean, rings still adorn noses, ears, arms, ankles and toes, but civilized nations encourage the wearing of rings only on the fingers and in the ears, though earrings are unfashionable at times. As an ornament to rings the diamond maintains the first place, though many other precious stones, such as the amethyst, turquoise, topaz, pearl and sapphire

are extensively worn. Until the fourteenth century thumb rings were commonly worn, and Falstaff boasted that although he was enormously fat, he could in his youth "creep into an alderman's thumb ring." Modern rings are

OLD FORMS OF RINGS

(1) Ancient Egyptian ring
(2) Gold ring from Mycenae
(3) Egyptian signet ring
(4) Roman gilded bronze ring
(5) Grecian gold ring
(6) Gold signet of a Brahman
(7) Anglo-Saxon betrothal ring
(8) Jewish marriage ring
(9) Papal ring, fifteenth century
(10) Betrothal ring, seventeenth century
(11) Wedding rings of Luther and Katharina
(12) Merovingian ring

chiefly made in London and Birmingham, England; and in Paris, Vienna and New York, and are sold at prices ranging from a few dollars up to thousands of dollars each, according to the stones with which they are set.

The ring of the Pope is of especial interest. It is presented to him at his coronation by the city of Rome, and bears his name and a picture of Saint Peter in a boat. Every official decree of the Pope must be signed with this signet. When the Pope dies his ring is broken, and a new one is prepared for his successor. The Papal ring shown above is not the type worn by the Pope, but is an example of the huge thumb rings given by the Popes to newly-appointed cardinals.

Consult Edwards' *History and Poetry of Finger Rings.*

RING AND THE BOOK, The, a remarkable poem by Robert Browning, the greatest achievement of his genius. It was suggested by an old book which he picked up on a stall in Florence, and tells the story of the marriage, unhappy life, and death of Pompilia, one of the loveliest heroines in all literature. She was married to Count Guido Franceschini, who chose her only because he thought she was wealthy; and when he discovered that she was but a poor girl he murdered her and her parents. The unique feature is the method presentation; each person concerned tells the tale from his own point of view, and the same story is thus repeated over and over, yet without loss of interest.

RINGWORM, *ring'wurm,* so called because it spreads in rings, is a skin disease caused by a minute vegetable mold, or fungus. The affected spots become inflamed and covered with scales, and the victim suffers from constant itching. A very common form of ringworm attacks the scalp, causing the hair to break off, loosen and fall out. Temporary bald spots appear in affected areas. Ringworm of the beard is another prevalent form (see Barber, subhead *Barbers Itch*). A third variety, called body ringworm, appears most often on the face, neck and arms. To check those forms which attack hairy parts of the body physicians apply ointments or medicines which kill the parasite. These include sulphur ointment, mercurial ointments, and preparations of iodine, carbolic acid and caustic potash. Before these can be applied affected areas must be shaved and roots of diseased hairs be pulled out. Scales and scabs are loosened by hot water or oil applications.

All cases should have the constant attention of a reliable physician, as diseased areas are made inflamed and sore if the treatment is continued too long, and the eruption breaks out anew if treatment is discontinued before the fungus is killed. The X-ray has also been found helpful. Body ringworm generally yields readily to treatment with ointment, the chief source of danger being the patient's tendency to spread the disease by scratching the spots. As all forms are extremely contagious, utmost care must be taken to have the victim use his own comb, towels, wash cloths and other personal articles.

RIO DE JANEIRO, *re'o da zha na'ro,* capital of Brazil and the second largest city of South America. Buenos Aires, the capital of the Argentine Republic, is the first city of the world south of the equator, and Rio, as it is familiarly called, with a population of 1,157,873 (Census, September, 1920), comes next. Rio de Janeiro is 5,204 miles from London, 4,748 miles from New York and 5,160 miles from New Orleans. It is situated on the west side of the Bay of Rio de Janeiro, which, stretching inland for several miles and studded with islands and surrounded by mountains, is accounted the most magnificent harbor in the world. The city owes much of its beauty to the fact that it is built on the flat land and low, wooded hills between the mountains, the spurs of which project in some places almost to the margin of the bay and form picturesque valleys within the city limits. The residence quarters of the city follow some of these valleys up the sides of the mountains, and in other places the poorer residents have built their huts on the steep slopes.

Until the latter part of the nineteenth century Rio de Janeiro was a typical Latin-American city, a picturesque Old World sort of place which had its daily paper, founded in 1808, its National Museum and its botanical gardens, and enjoyed an enormous export trade in coffee. Then it was a city with narrow streets, poorly-built wharves and a harbor that was filling up with silt so that no large ships were able to dock. To-day, while retaining all of its beauty and charm, it is an almost perfect example of the ideal modern city, with beautiful public buildings and private residences, clean, asphalt streets, palm-bordered boulevards, good sanitation and pure water. One of the interesting features of this new city is a boulevard which has been laid out along the shore of the bay for a score of miles, at an expense of $17,000,000. This is bordered with trees, and its wider parts are filled in with gardens.

The Mangue Canal, a waterway originally built for connecting the bay with a great city market, has been enclosed with stone walls and bordered with great, royal palm trees, and is now part of a public pleasure ground. The most famous street of the city is the Rua do Ouvidor, a promenade lined with shops, cafes and newspaper offices. There are many public parks and gardens, for, as in most Portuguese cities, the principal buildings are grouped around squares. The most famous of the parks is the Botanical Garden, founded in 1808, noted for its rare plants from all over the world and for its avenue of royal palm trees. These trees

LOCATION OF RIO DE JANEIRO
The square black spot in the corner map shows the area included in the larger map.

are not native to Brazil, but were imported originally from the West Indies. In the Botanical Garden may be seen the original "mother" palm, the first to be imported, with a bronze tablet on the trunk to commemorate the event.

Many of the public buildings, both the old and the new, are magnificent. One of the most notable is the National Museum, once the residence of the Emperor Dom Pedro II. It now contains the most valuable collection of books in South America, and has its own printing and bookbinding shops. Others include the palace of justice, one of the finest buildings in the city

and the headquarters of the ministry of public industry and public works; the Cattete Palace, the official residence of the President of the republic; the Itamaráty Palace, which is now occupied by the Ministry of Foreign Affairs; and the Municipal Theater, which ranks with the greatest theaters of Europe. Another interesting feature of the city is the aerial trolley which connects Sugar Loaf, a mountain peak at the entrance of the bay, with the main part of the city. In marked contrast to this triumph of twentieth-century engineering construction is the primitive public fountain, a long pipe with twenty or thirty taps, where the poor of the city may get free water. The Roman Catholic religion is the faith of the majority of the inhabitants. The city has several professional and secondary schools, but elementary education is somewhat neglected.

About the year 1900 Rio de Janeiro began to realize that its position as the shipping port for the richest, most productive and most thickly-settled region of Brazil depended on extensive harbor improvements. These have been completed at a cost of millions of dollars. The entrance to the harbor is open to the largest vessels, and inside there is room for all the navies of the world. The water front is lined with walls of solid masonry. Deep-water quays, which are great piers of concrete and stone, have been built, beside which the largest boats can anchor. Both hydraulic and electric power are available for loading and unloading the trams, and railways connect the quays with the shipping and warehouse districts. Besides the enormous coffee output, the city's exports include sugar and tapioca, tobacco and cigars, meat and hides from the great cattle plains of the south and west, and cabinet woods from the forests.

In 1916 it was announced that, following the successful example of the neighboring city of Nictheroy, Rio de Janeiro would adopt the single tax, thus becoming the largest city in the world to have approved the Henry George theories. See BRAZIL.

Consult Bell's *The Beautiful Rio de Janeiro;* the Pan-American Union's *Municipal Organizations in South America.*

RIO GRANDE, *re'o grahn'da,* a river which forms about half of the international boundary line between the United States and Mexico. Rising in the Rockies of Southwestern Colorado, it flows south through New Mexico, then follows a southeasterly course between Texas and Mexico, emptying into the Gulf of Mexico near the town of Brownsville, Tex. It has a total length of 2,000 miles, but is of little value for navigation. In its upper reaches there are numerous gorges and cataracts, and for miles along its middle course it flows through an arid country. Large quantities of its waters are used for irrigation purposes by the people of New Mexico, so that its bed becomes a dry valley in some sections during the hot weather. Small boats navigate the river for 250 miles from the mouth. The region along the Rio Grande was the scene of many of the border disturbances that caused the invasion of Mexico by United States troops in 1916. See MEXICO, subtitle *Government and History.*

Consult Stevens' *The Valley of the Rio Grande.*

RÍO NEGRO, *re'o na'gro,* the main stream of a river system flowing through the equatorial forest region of South America. By some geographers the Guainia, rising in Southeastern Colombia, is considered the headstream; others consider the headstream to be the Uaupés, which rises in the Andes in Western Colombia. The former flows in a northeasterly direction to the boundary of Venezuela, then turns to the southeast and makes its way into Brazil, where the Uaupés joins it. From this point the river flows in a general southeasterly direction, emptying into the Amazon through an estuary fifty miles above the Madeira River. Including the Uaupés, the Rio Negro is 1,400 miles in length. Long stretches of the upper river are navigable, but the stream is of little value commercially because it flows through a wild and unsettled country. The thriving trading city of Manaos is located on its banks ten miles above its mouth, and the Rio Negro from this point to the Amazon is an important trade route for ocean vessels.

RIOT, *ri'ut.* In criminal law a riot is an offense against the public peace by three or more persons who have banded themselves together without authority, with the intent and purpose of assisting one another in threatening violence or in violently opposing an individual or a corporation that has worked a real or supposed injury to those engaged in the riot. A riot is characterized by such disturbance as to jeopardize public safety or to cause public terror. At least three people must engage in the offense to have it recognized as a riot. A similar offense committed by less than three people is an *affray.*

The statutes of different states and provinces fix the penalty of those convicted of engaging

in a riot. If rioting results in loss of life the penalty is more severe than when it results in destruction of property alone. If the riot is against the government those engaged in it may be convicted of treason.

Riot Act. The Riot Act was an act passed by the British Parliament during the reign of George I. It was commanded to be read aloud by a justice of the peace or any other authorized officer of the law, whenever people assembled themselves for the purpose of creating a disturbance or committing any other unlawful act. It commanded the people to disperse in the name of the sovereign. In America "to read the riot act" has come to be a slang expression for uttering a severe reprimand.

RIPARIAN, *ri pa' ri an,* **RIGHTS.** The owner of land bordering on a stream that is not navigable owns that portion of the bed of the stream which adjoins his land, as far as the central line or middle of the stream. He is also entitled to his share of the water for such uses as will not impair its availability for any purpose farther down the stream. He is not entitled to all the water, neither can he make such use of the stream as will pollute the water, nor turn it into another channel, if by so doing he will prevent those farther down the stream from the natural benefits they would receive from it. These rights are known in law as *riparian rights,* and the owner is known as a *riparian proprietor.* The term is derived from the Latin *ripa,* meaning *river bank.* The remedy for violation of riparian rights is usually through injunction (which see).

RIP VAN WINKLE, *wink' l,* a famous story by Washington Irving, published in 1819, in the *Sketch Book.* Rip, the title character, is a lazy, good-natured, intemperate ne'er-do-well, who on one of his hunting trips meets with Henry Hudson and his crew in the forests of the Catskills. He drinks of the liquor with which he is made to serve his companions, and as a result falls into a sleep from which he does not waken for twenty years. Returning then to his home he finds that his scolding wife has died, as have most of his old friends, his daughter has married, and his country, which when he fell asleep was a colony of England, has become a republic. The story was dramatized several times before Boucicault, in 1866, produced the more effective version which Joseph Jefferson made famous.

RISTORI, *rees toh' re,* ADELAIDE (1822-1906), an Italian actress, was born at Cividale. Her parents were strolling players, and she herself began while a child to take part in their crude plays. At the age of fourteen she gained a position with a reputable company and won fame as Francesca da Rimini in the tragedy of that name. Her next great success came when she was eighteen years old in her acting of Schiller's *Mary Stuart.* Her beauty and talent had by this time attracted many ardent admirers, and one of these, the Marquis del Grillo, she married in 1847.

Each year she added to her stage triumphs until, in 1855, she was called to Paris, where she surpassed all her former efforts. Seldom if ever had there been a similar sensation in the theatrical world. The great Rachel, whose equal as an actress many French critics had declared could never exist, was playing in the city at the same time, and crowds argued over their respective merits with such anger that many persons came to blows. In 1857 Ristori played in Spanish at Madrid and audiences shouted their admiration. She visited America four times between 1866 and 1885, and retired from the stage in 1888 with the declaration of Italian critics that she was the greatest actress Italy had ever produced.

RIV'ER. All the facts associated with the formation of a river and the uniting of streams into a river system may be observed in a roadway after a shower. The drops of water collect into little rills which unite with others to form larger rills, and a number of these unite and form a main stream which carries the water down the embankment. Each tiny stream wears its channel in the soft earth, and the raindrops that flow in one are separated from those flowing in another by a little ridge or a gentle slope whose crest forms a watershed in the miniature landscape. However large a river may be, it has been formed in a manner similar to that of the little stream flowing down the embankment. The only difference is that in case of the river we deal with larger facts.

A river unsually has its beginning far up in the mountains or hills, with a little spring or a melting glacier for its source. As it flows on, other streams join it and it continues to increase in volume. The river wears for itself a channel which is lower than the surrounding country. The bottom of the channel is known as the *bed* of the stream, and the sides are the *banks.* The *right* bank of a river is that on the right hand of the observer when he is facing downstream. A river and all its tributaries constitute a *river system.* The area drained by a river system is known as the river *basin.*

The basin of the Mississippi River, for instance, includes that portion of the United States drained by that river and its tributaries. The volume of a river depends upon the area of its basin and the amount of rainfall. Heights of land which separate rivers and river systems are known as *divides*.

The Work of Rivers. The course of a river is divided into three parts—the upper, the middle and the lower course. These parts are seldom of equal length, and each is marked by distinctive characteristics. In the upper course the slope of the channel is steep and the current swift. The channel has been worn down rapidly and the banks have a steep slope, sometimes being nearly perpendicular. The water carries quantities of sand and gravel and sometimes rocks of considerable weight, which are borne swiftly along by the current, constantly wearing away the bed of the stream. The swiftness of the current enables it to remove most of the obstacles in its course, and the channel is free from small curves. The channels of the tributaries are usually worn down to the level of the main channel, forming ravines.

The river enters upon its middle course when it leaves the mountainous or hilly region in which it rises, and enters the lower lands where the slope is more gentle. The current is not swift enough to carry the heavy material that it has brought down to this point, and this is deposited on the bottom of the channel. For this reason the beginning of the middle course of many rivers is marked by gravel beds. Since the channel is worn more slowly the slope of the banks is more gentle and the valley is broader. The current has lost much of its velocity and it cannot remove obstacles; therefore it must flow around them, and so the middle course is characterized by numerous curves, some of which may take the river miles out of the general direction of its flow. The middle course of the Mississippi affords an excellent illustration of this fact. Again, obstructions in the middle of the channel collect deposits of silt until finally they reach the surface and form islands. Islands in the upper part of the stream, on the other hand, consist of rocks which the current has been unable to wear away.

The lower course of a river differs but little from the middle course. The current is slower, and the continuous deposit of silt raises the bed of the stream. Frequent overflowing of the low banks forms vast flood plains which, when drained, make productive farms. In case of the Mississippi this process of raising the river bed has continued until the river is higher than the surrounding country, and disastrous floods follow a break in the banks.

Cataracts and Canyons. Rivers frequently flow over rocks of unequal degrees of hardness; the softer rock is worn away, leaving the harder as an obstruction. These conditions are usually found where the current is swift, and rapids or cataracts are formed. The cataracts of the Nile and the rapids in the Saint Lawrence are good illustrations. When the soft rock lies under a hard layer a fall like Niagara is formed. In mountainous regions the swift current sometimes wears a deep channel with vertical walls forming a canyon. The Grand Canyon of the Colorado and the Grand Canyon of the Yellowstone, two of the world's most stupendous wonders, were formed in this way.

Estuaries and Deltas. A river flowing slowly into an arm of the sea, protected from great waves and high tides, deposits its silt at its mouth and builds up a vast alluvial plain called a *delta*. The deltas of the Mississippi and the Nile are excellent examples of such formations. When the bed of the river in its lower course slopes into the sea, forming a drowned valley up which the tides extend without obstruction, the silt is carried away and the mouth of the river remains a broad estuary like the Gulf of Saint Lawrence and the Rio de la Plata. These estuaries form excellent harbors, and upon them we find some of the greatest seaports. W.F.R.

Consult Russell's *River Development as Illustrated by the Rivers of North America;* Greenwood's *Rain and Rivers;* Bellasis' *River and Canal Engineering.*

Related Subjects. The following topics, which are closely related to this subject, are treated in these volumes:

Alluvium	Flood
Basin	Flood Plain
Canyon	Rain
Delta	Spring
Divide	Valley
Erosion	Waterfall

In addition to these general articles, these volumes contain articles on the following rivers:

AFRICA

Congo	Senegal
Gambia	Shire
Niger	Victoria Falls
Nile	Zambezi
Orange	

ASIA

Amur	Hoang-ho
Brahmaputra	Hugli
Euphrates	Indus
Ganges	Irrawaddy

Jordan
Lena
Mekong
Nerbudda
Ob
Sutlej
Syr-Darya
Tigris
Yalu
Yang-tse-kiang
Yenisei

AUSTRALIA

Cooper's Creek
Lachlan
Murray
Murrumbidgee

EUROPE

Adige
Arno
Danube
Dnieper
Dniester
Don
Elbe
Garonne
Loire
Main
Marne
Meuse
Moselle
Neva
Oder
Po
Rhine
Rhone
Rubicon
Saône
Save
Scheldt
Seine
Somme
Tiber
Ural
Vistula
Volga

NORTH AMERICA

Alabama
Albany
Allegheny
Apalachicola
Arkansas
Assiniboine
Atchafalaya
Athabaska, subhead
Athabaska River
Bighorn
Brazos
Canadian
Chattahoochee
Chaudière
Chickahominy
Churchill
Colorado
Columbia
Connecticut
Coosa
Cumberland
Delaware
Detroit
East
Fraser
Genesee
Gila
Great Kanawha
Green
Hamilton
Housatonic
Hudson
Humboldt
Illinois
James
Kansas
Kennebec
Kentucky
Kootenay River and District
Lackawanna
Lehigh
Mackenzie
Merrimac
Minnesota
Miramichi
Mississippi
Missouri
Mobile
Mohawk
Monongahela
Montgomery
Moose
Nelson
Niagara Falls and River
Ohio
Ottawa
Peace
Pecos
Penobscot
Platte
Potomac
Rappahannock
Raritan
Red
Red River of the North
Restigouche
Rio Grande
Roanoke
Rock
Sabine
Saco
Sacramento
Saguenay
Saint John
Saint Lawrence
Saint Mary's
San Joaquin
Saskatchewan
Savannah
Schuylkill
Scioto
Shenandoah
Skeena
Snake
Stikine
Susquehanna
Tennessee
Tombigbee
Wabash
Washita
White
Willamette
Wisconsin
Yazoo
Yellowstone
Yukon

SOUTH AMERICA

Amazon
Jurua
Madeira
Magdalena
Orinoco
Paraguay
Parana
Pilcomayo
Plata, Rio de la
São Francisco
Tapajos
Tocantins
Uruguay
Xingu

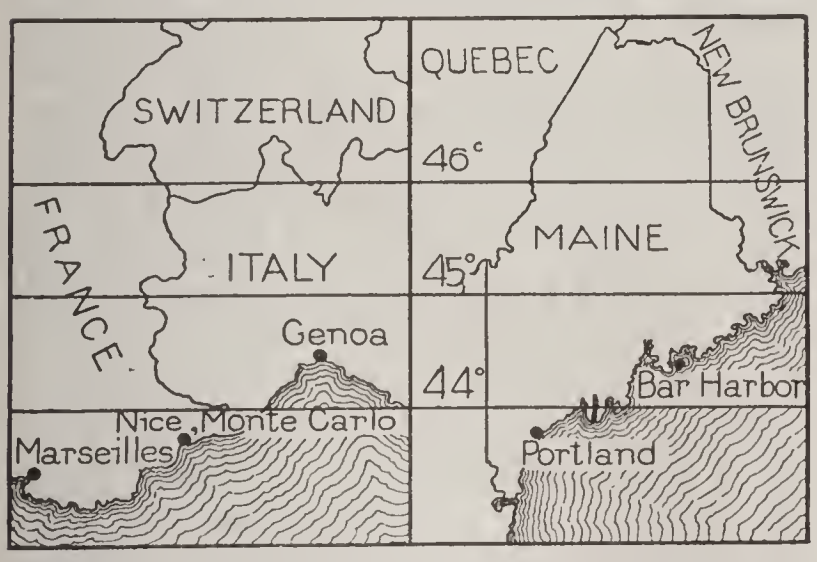
RIVERSIDE, CAL., one of the most important orange-growing centers in the United States, is situated in the southwestern part of California, on the Santa Ana River, ten miles south of San Bernardino and fifty-seven miles east of Los Angeles. The city is the county seat of Riverside County. Transportation is provided by the Southern Pacific, the Atchison, Topeka & Santa Fe and the San Pedro, Los Angeles & Salt Lake railroads, and by the Pacific Electric Interurban line. The first settlement was known as *Jurupa Rancho* when it was purchased by the Southern California Colony Association in 1870. It was incorporated as a city in 1883 and is now governed on the commission plan. The population was announced as 19,341 in 1920, a gain of 27 per cent over the number of people in 1910. The city has an area of thirty-nine square miles.

Riverside lies about 900 feet above sea level, and is built on ground which slopes gently toward the east. It is a city of beautiful, artistic homes and public buildings, and its wide, clean streets are shaded with luxuriant growths of trees. Especially noteworthy are Magnolia Avenue, a parkway ten miles long and 130 feet wide bordered with pepper trees, and Victoria Avenue, also a parkway, lined with semitropical fruit trees. Because of its healthful climate and attractive environs Riverside is famous as a health resort.

The people are engaged chiefly in the cultivation of alfalfa and fruits, especially lemons and oranges. The San Bernardino Valley, in which the city is located, is noted for its abundant growth of fine oranges, and Riverside annually ships about 6,000 carloads of this fruit. One of the most complete and extensive systems of irrigation is in operation here. The manufacture of Portland cement is also an important industry. The state citrous experimental station is located at Riverside, and it has also a Carnegie Library, a handsome $250,000 courthouse and the Sherman Institute, an Indian school conducted by the government.

RIVES, *reevz,* Amélie (1863-), since her marriage Princess Troubetzkoy, a novelist and poet, was born at Richmond, Va. Her popular work, *The Quick or the Dead,* was the most talked-of book in America when it was first published, and on its appearance the young author stepped from obscurity to wide celebrity. It describes the spiritual struggles of a beautiful woman who has lost her idolized husband, and who wins the love of his cousin, almost the former's duplicate in personal appearance. In the end, after terrible mental anguish, she decides that the influence of the dead is too potent a factor in her life for her to marry the "quick," that is, her husband's cousin. This novel was discussed, attacked and applauded; was barred from libraries and championed in pulpits. Her first book, *A Brother to Dragons,* was published in 1888. During the same year she was married to John Armstrong Chandler, from whom she was divorced a few years later. In 1896 she was married to Prince Pierre Troubetzkoy. Her later writings include *The Witness of the Sun, According to Saint John, Athelwold, Tanis, the Sand-digger, Hidden House, A Damsel Errant, Barbara Dering* (a sequel to *The Quick or the Dead*), *World's End* and, in 1921, *As the Wind Blew.*

RIVIERA, *re vya' rah,* a narrow strip of land that stretches for 172 miles along the Gulf of



WINTER AND SUMMER RESORTS IN THE SAME LATITUDE

While Maine harbors are blocked with ice, orange, olive and palm trees are at their best on the Riviera, but while the people of Nice are enduring the dry heat of summer, Americans are flocking to the cool coasts of Maine. The comfortable winters of the Mediterranean land are due to warm winds from the South Atlantic; the lower temperature of New England results from the nearness of the icy Labrador Current.

Genoa at the northern end of the blue Tyrrhenian arm of the Mediterranean Sea, between the mountains and the shore. The sun and the south winds warm it, while the Alps in the background, all gray and green with vineyards and olive groves, with swift little, rushing rivers and clanking mill wheels, shut off the north and east winds. These conditions make the climate so mild and the scenery so beautiful that the Riviera is one of the famous health resorts of the world. From Nice (in France) in the west, into Italy through Genoa to Spezia in the east, the towns and villages are almost continuous, linked together by a famous carriage road, originally built by the ancient Romans, and by a railroad which burrows through the many projecting headlands in a series of about eighty tunnels.

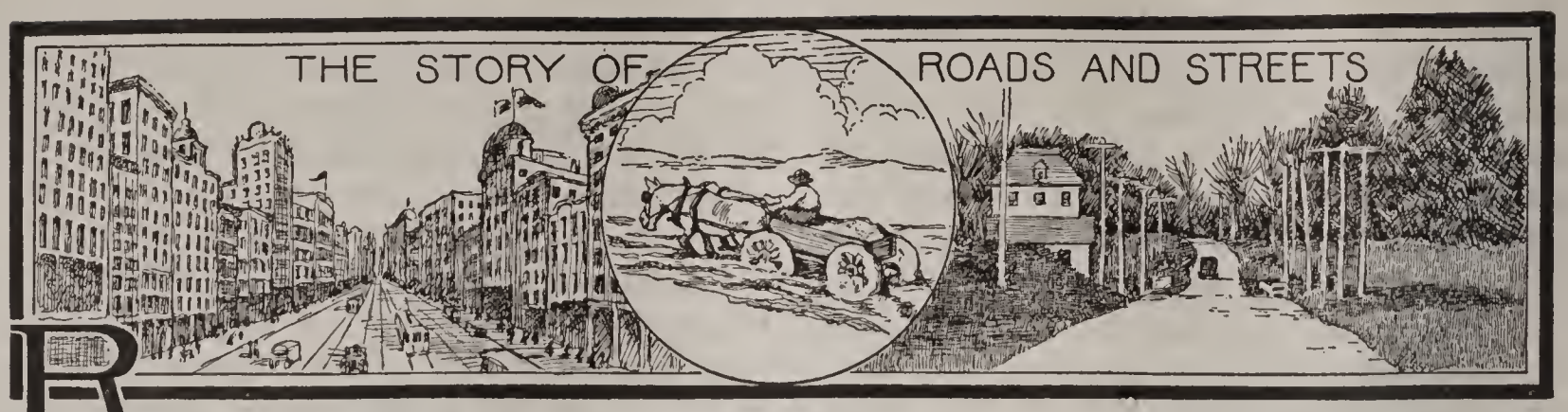
The towns are very picturesque, with houses that are rose and cream and brown in color, with green and fragrant gardens, and with shops filled with curios and trinkets that are a continuous delight to the tourists, invalids and convalescents who throng there throughout the winter months. Great masses of roses, violets and hyacinths are cultivated for the London and Paris markets, as well as subtropical fruits, dates and bananas, pomegranates and prickly pears. Some of the principal towns are Nice, Monaco, Monte Carlo and Mentone, in France, and Bordighera, Ospedaletti, San Remo, Rapallo, Levanto and Spezia, in Italy.

Consult Home's *Along the Rivieras of France and Italy;* Scott's *The Riviera.*

ROAD RUNNER, a swift-footed bird of the cuckoo family, found in the Southwestern United States and Northern Mexico, known also as the *chaparral cock, ground cuckoo* and *snake killer.* The name *road runner* refers to its habit of rac-

THE ROAD RUNNER

ing down the road in front of horsemen or vehicles. When it runs, it spreads wings and tail into a sort of aeroplane and speeds along at an amazing rate. It is nearly two feet in length and has long legs with two toes at the front and two in the back, and a large tail with graduated feathers, which it erects saucily at will. In color it is a glossy, greenish-brown, each feather being fringed with white. Its nest, which is placed in low trees or bushes, is made of sticks. In it are placed the four to six yellowish eggs. The road runner feeds on grains and insects. See Cuckoo.



ROADS AND STREETS. The word *road* is derived from the same source as *ride,* and in its broadest sense refers to a public way connecting towns and rural communities. *Highway* is a more formal term, with the same meaning, but it properly refers only to a main or principal road, as distinguished from one of minor importance. An improved road between two large cities may be called a highway, but the ordinary dirt road of the rural districts deserves the less imposing name. The term *street,* though it formerly meant any paved road, now refers only to the roadways in towns and cities. The word *street* is derived from the Latin *strata via,* meaning *paved way.*

Roads and highways have always been an index of national greatness, as well as an important factor in the advancement of a people. It has been true, almost without exception, that the older a country is and the more developed its civilization, the better roads it has had. The power and culture of Rome were shown in the splendid system of highways connecting the imperial city with distant provinces. Even in England, far from Rome, the Romans left their mark in a number of great roads, and on the continent their roads remain to this day. Many of the Roman roads, built from 1,500 to 2,000 years ago, are the foundations of modern highways, and a few of them are still in use, with practically no improvement, just as the Romans left them. As late as the eighteenth century roads in France and other parts of Europe were built by methods only slightly different from those of the ancient Romans.

Roads in Europe. In nearly all of the nations of Europe the public roads are under the general supervision of the government, and are directly in charge of trained engineers. They may be divided into two groups—the *national* roads, properly called highways, and the *local* roads, the care of which is in the hands of the local communities. A few good roads existed in Central Europe even in medieval times; an English law on roads was passed as early as 1285, and the first tolls for the repair of roads were collected in 1346. France was for several centuries the leader in the improvement of roads, and taken as a whole, the roads of France, together with those of Switzerland, are probably the best in the world to-day. Great Britain has excellent roads in the remoter rural districts as well as near the towns, and the smoothness of English roads is proverbial. Germany, too, has an extensive system of fine roads, and the kingdom of Prussia, with an area half that of Texas, has about 75,000 miles of improved roads, about one-third as much as the mileage of improved roads for the whole United States. An unimproved dirt road, in fact, will be found with difficulty in any part of Western Europe, and where one is found it is only a minor link in a great highway system.

In Canada and the United States. In America an entirely different condition exists. Except in the cities, and with one or two other conspicuous exceptions, there were few improved roads of importance either in Canada or the United States until after 1880. Europe has only one-half the road mileage of the United States, but its proportion of improved roads is several times as great. At the present time, although much progress has already been made, only ten per cent of the road mileage in the United States is improved, and in Canada the percentage is even less. The reason for this condition is not far to seek, nor is it as yet a disgraceful one. Europe had roads, and good roads, too, when the American continent was unknown to Europeans. Until the nineteenth century the greater part of North America still had no roads, and only in the states along the Atlantic coast was there any considerable mileage. About 1800 the United States was literally in the midst of a period of turnpike construction. This was only a passing phase of road construction, but the privately-owned turnpike, with a tollgate every five or ten miles, remained in common use until some time after the War of Secession. Between 1792, when the first turnpike was authorized, and 1812, over 300 charters for such roads were granted to private companies, over 4,500

miles of road had been constructed and over $7,000,000 invested. Again, about 1830, the United States was in the midst of a road-building period. During these years the Federal government was building the only great highway it ever undertook, the Cumberland Road (which see), also called the "great national pike."

In the meantime, during the first half of the nineteenth century, the United States had vastly increased its area, until it extended from ocean to ocean. As the flood of immigration spread over the Mississippi Valley and the West, there was an immediate necessity for roads. They were needed on such a vast scale that there was neither time, labor, nor money to build improved roads. This period of expansion was followed by an area of railroad construction, which opened up a still vaster territory. For a generation or two the population of any newly-settled region is too busy wresting a livelihood from the soil to give its attention to such secondary matters as road building. This was true in the United States and to some extent it is true in Canada at the present time. It is only when a community has, in a sense, grown up and reached some degree of stability that it begins to consider the advantages of good roads, and to bring these advantages within reach of its citizens.

Improved Roads and Pavements

An improved road is one that has been properly graded and drained, and has been given a surface covering of some material which makes it reasonably firm and durable. Such a covering is called *pavement,* a word derived from the Latin *pavire,* meaning to *beat* or *tread down.* The ancient city of Babylon had paved streets, and the pavement probably consisted of beaten clay, laid to a considerable depth to present a hard and even surface. The old Roman cities of Pompeii and Herculaneum were paved with stones and volcanic matter thrown from the crater of Vesuvius.

Stone. Stone blocks, preferably of granite, form the most durable pavement, but they have great disadvantages. The noise of heavy vehicles drawn over stone pavements is very trying, and the uneven stones severely test the wearing qualities of wagons. Granite pavement is very expensive, but when properly laid will last for years without repair. It is used largely in cities and areas carrying much heavy traffic.

Macadam and Concrete. Pavements made of small, crushed stone, instead of large blocks, have been in general use since the beginning of the nineteenth century. This form is called *macadam,* from the name of the Scotch engineer, John L. MacAdam (1756-1836), who introduced it. Formerly all macadam was *water-bound;* that is, the stones were held together by a natural cement of dust and moisture. Macadam marked a great advance in paving methods, but it does not wear well under heavy or fast traffic. Water-bound macadam, moreover, is dusty in dry weather and hard to clean. Its place is gradually being taken by bituminous-bound macadam, which is made in the same way except that a special cement of asphalt or tar is used. The binder may be mixed with the stones before the pavement is laid, or may be sprinkled on it afterward. Bituminous-bound pavement which is mixed before laying is usually called bituminous-concrete, or merely concrete.

Asphalt. This form of pavement consists of two parts, a *binder* and a *wearing surface,* laid on a solid foundation. The foundation is usually of concrete, and the binder, which serves to unite the foundation and the wearing surface, is of small, broken stones mixed with an asphaltic cement. The wearing surface is a mixture of sand, Portland cement (or carbonate of lime) and asphalt, mixed together at a high temperature and then spread on the roadway. Asphalt pavement is sometimes laid in blocks, the mixture being first molded by machine, and then when cold laid like bricks. It is noiseless and easily cleaned, but is not suitable for heavy traffic (see ASPHALT).

Brick. In recent years the use of brick for paving has greatly increased. The bricks intended for such use are specially prepared and are so hard-burned that they have a glassy appearance. When laid on a foundation of concrete, brick will sometimes outwear every other kind of pavement except stone blocks. It is easy to clean, but it has the disadvantage of being very noisy for horses and metal-tired wagons. It is an excellent pavement for roads on which automobile traffic is heavy and other forms of traffic are light.

Wood. Wood pavement is made of round or brick-shaped blocks of wood with the spaces between them filled with tar or a mixture of tar and sand. Round blocks were formerly in common use, but have now been almost en-

tirely superseded by brick-shaped blocks, which are much more expensive and provide a much smoother surface. Wood possesses the great advantage of silence, the heaviest traffic passing over it almost noiselessly. The wood, usually cedar or yellow pine, undergoes a special treatment called "pickling," or soaking the blocks in creosote or tar. Wood pavement wears unevenly, and is not economical, but its use is increasing, as the smoothness of the road and the silence of traffic are considered sufficient compensation for the extra cost of upkeep.

Comparative Cost. The cost of paving a street varies greatly according to local conditions. The initial cost of grading, the freight charges on materials, the character of foundations, conditions in the local labor market—all must be considered. Comparative costs, unless based on similar conditions, are worse than useless. The following figures are careful estimates which should not be taken as exact for every section, and the figures are those for normal times, before the period of inflation of prices after the great war:

Sand-clay, per mile of 15-foot road	$600 to 800
Burnt-clay, per mile of 15-foot road	1,500
Macadam, per mile of 15-foot road	5,000
Concrete, per mile of 15-foot road	10,000
Asphalt, per mile of 15-foot road	15,000
Wood-blocks*, per mile of 15-foot road	20,000
Brick, per mile of 15 foot road	15,000 to 20,000

*On concrete base, which represents about one-half the total cost.

Comparative Life of Pavements. The life of a pavement, or the period during which it may be used before renewal, necessarily depends on the heaviness of the traffic and the amount of repairing done from time to time. Under ordinary conditions granite blocks will serve for twenty years or longer; asphalt, eighteen years; brick, fifteen years; wood blocks, ten to fifteen years; bituminous concrete, eight to ten years; macadam, eight years. Much depends upon the quality of material.

The Good Roads Movement

At the beginning of the twentieth century the United States had about 2,250,000 miles of roads, of which less than eight per cent was improved. The 2,000,000 miles or more of unimproved roads are ordinary dirt roads. Once outside the limits of cities and towns the traveler in 1880 and 1890 was sure to find nothing but a natural dirt road, filled with ruts, muddy in rainy weather and rough in dry seasons. So long as travel on country roads was limited to horses and horse-drawn vehicles, the attempts to maintain good country roads were hardly more than spasmodic. The introduction of the bicycle and the automobile, by increasing the speed of vehicles and by widening the circle of pleasure excursions, became one of the chief factors in leading to a demand for good roads. Rural communities, however, are now also awake to the actual money profit there is in good transportation to markets and to the other advantages of good roads.

Benefits of Good Roads. There is no fixed standard by which the benefits derived from good roads can be measured, although it is now generally acknowledged that these benefits are real and positive. No community which has improved its roads has ever regretted the step. So closely are the public roads connected with every aspect of community life that any method of measuring the benefits of good roads is incomplete. For convenience, however, they may be divided into economic benefits and social benefits.

Economic Benefits. There are certain direct advantages which follow the improvement of roads. First is the lower cost of hauling, which may be the result of better road surface, of lower grades or of shorter distances. The farmer is enabled to haul to market the same load with greater speed, and consequently in less time, or a greater load in the same time. A reduction of time is equivalent to a reduction of distance from the market centers. Good roads, therefore, bring the farms nearer to town, and it is easy to see that improved roads mean greater farm values. In addition, a good road makes hauling largely independent of the season or weather conditions. Market prices, even for staple crops, show considerable variation throughout the year. Where bad roads prevail it is not uncommon for the farmer to find that he must move his crops not when the market price is favorable, but when the roads are fit for travel.

Every farmer sooner or later realizes the desirability of diversified crops. Diversified farming usually involves a change from staple crops, such as corn and wheat, which can be stored, to more perishable vegetables and fruits, which must be moved from the farm at once after they ripen. The prime requisite for di-

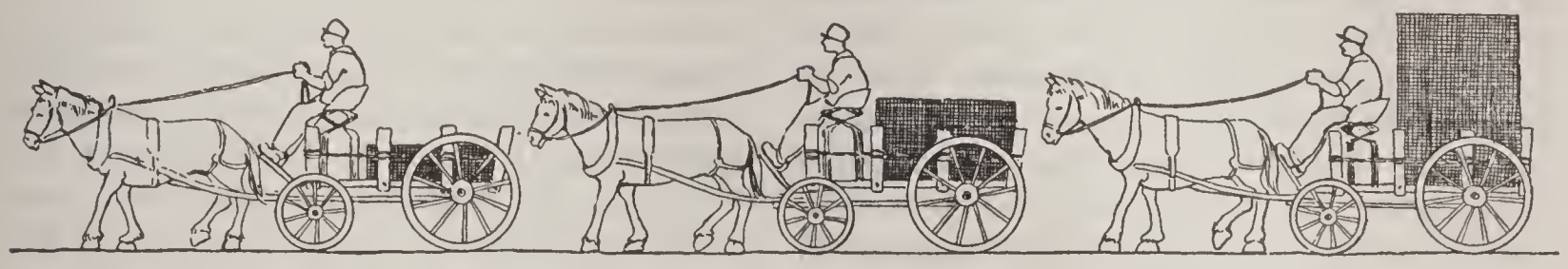
versified farming is a good market. The market may be a near-by town, or it may be a distant city, with railroad connections. In any case, speed of transportation from the farm to the unloading point is essential. A farmer who lives ten miles from town and raises peas, spinach and other spring crops, is at a great disadvantage if his market road is poor, whereas the farmer twenty miles from town, but on a good road, may visit the market every day without great expenditure of time.

When any community passes from a condition dominated by bad roads to one characterized by good roads, land values in the community rise. In cities, in fact, an owner of land usually adds the taxes for paving and other improvements to the price he fixes for the land. Of course, a good road does not add to the fertility of the soil, but it does improve the *site value,* the value of land with reference to markets, schools and towns. Any increase in value is partly offset by taxation, but it has been found in every case that the landowner appreciates the improvement and sets an increased price on his property.

The roads of the United States and Canada are being used each year by an increasing number of tourists, many of them in automobiles. Automobilists visiting Colorado spend in that state alone about $3,000,000 a year. This is a return which more than pays the cost of maintaining good roads and leaves a margin of profit. Much has already been done by motor tourists to secure good roads, and the sentiment in favor of good roads owes more to automobile owners than to any other single factor.

Social Advantages. One result of good roads may be better schools. The place of the one-roomed red schoolhouse is being taken gradually by the graded, consolidated country school, with several teachers under a competent principal. Consolidated schools are possible, however, only where the roads are kept in good condition. Poor roads often prevent the consolidation of several small, weak schools into one strong school. Even the district school suffers from poor roads, for it is a common practice for parents to keep their children home in severe weather which makes the roads impassable. Good roads also encourage the use of the schoolhouse as the social and intellectual center of the community. Grange meetings, lectures, entertainments and institutes of various kinds may well be held in the schools, but if the people are to get the full benefit from their schools, the buildings must be accessible at every season.

The improvement of rural free delivery service is dependent on the improvement of roads. Regular mail delivery demands improved roads, and in some cases rural delivery has been abandoned by the government because of poor roads. All social activity in rural communities is dependent on the roads. Poor roads discourage attendance at public meetings or even neighborly visits, and under the worst conditions all travel is suspended. The importance of a good road is also great in another way, less tangible, less easy to value, but none the less vital. It is a matter of common observation that a well-built, well-kept road has aesthetic value. Aside from being more attractive in itself, it encourages the owner of land to keep his place in order. It is no wonder that a slimy, muddy bog in front of a farmer's door reacts on the whole family. An improved road is not only good in itself, but it may stimulate the residents along its borders to greater effort and greater self-respect.



THE AVERAGE LOAD ON VARIOUS ROADS

At the left is a representation of a load that can be carried on a dirt road; in the center, on a macadam road; at the right, on an asphalt road.

Some Conditions to Consider. Road making has become a highly developed branch of engineering. Expert work begins with the laying out of a road, avoiding on the one hand the meandering course of New England roads and the angularity of the section line roads of the Middle West. It is a recognized principle to avoid the heavy grades of hills as much as possible by winding around the hill, and to deviate from a straight line to avoid lowlands, or any place where drainage would be defective, for the necessity of thorough drainage is appar-

ent. Scenic effects are considered. A slight deviation that will include a commanding view is advisable, and the value of roadway trees is also recognized. All such accessories have an influence that is helpful to the community.

The greatest care should be bestowed on drainage ditches, necessary culverts and surface conditions. With a mileage so enormous as in the United States and Canada, it is manifest that for many years the larger part of the roads will be dirt roads; but that does not mean they cannot be improved. Engineers are studying every phase of the problem. Everywhere important trunk lines, the true highways, are receiving special attention; particularly good roads of this nature exist in Southern New England, in New York, Indiana and Ohio.

Results Already Accomplished. Steady progress is being made, both in the United States and Canada. For many years the improvement of country roads was left in the hands of the local communities, the county, the town or township, and the village. The road tax was often "worked out" by farmers and others who owned horses. Road making was regarded as something anybody could do; it was not considered as an exact science. It was not until after 1890 that the interest of the community at large in good roads began to be recognized. Before 1900 Massachusetts, New Jersey and several other states had constructed the first state roads. Since then about two-thirds of the states and several of the Canadian provinces have built roads or contributed a part of the cost. It is customary, though by no means a fixed rule, for the county to contribute one-half of the expense, leaving the other half to be appropriated by the state or province.

Still more recently many people have urged the national government to undertake the construction and maintenance of roads, on the ground that good roads, outside of thickly-settled communities, are a national problem. As early as 1893 the Congress of the United States established a bureau of public roads as a branch of the Department of Agriculture, and this bureau has been of great service, chiefly by building model roads in various parts of the country. Each year it sends out a "good roads' train," carrying the latest road-making machinery. At frequent intervals the engineers in charge construct short pieces of road, giving the local authorities an object-lesson in road making. In the national parks, such as the Yellowstone and the Yosemite, the government has maintained excellent roads, and it has from time to time made small appropriations to assist the states. In 1913 Congress appropriated $500,000 to be spent in coöperation with the states for the improvement of post roads, and early in 1914 a start was made on a new policy by a law appropriating $25,000,000 a year to be divided among the states, each state's allotment being available only on condition that it appropriate an amount equal to that received by it.

This appropriation, large as it is, is only a beginning of the solution of the problem. One of the leading advocates of good roads once drew up a plan for a comprehensive national system, to be built and maintained by the United States government. Investigation showed that the initial cost would be about $650,000,000, and the yearly expense of maintenance about $90,000,000, a cost which was considered prohibitive. It costs each year about $600,000,000 to carry the products of farms to market—in the United States alone. If this annual cost could be reduced by one-fourth, or $150,000,000, the construction of a comprehensive road system would be a paying investment, provided the annual expense and interest charge were less than $150,000,000. This is within the range of possibility.

As yet, perhaps, the most conspicuous results of the good roads movement are the plans for national and international highways. One of these, the *Meridian Road,* is to extend southward from Winnipeg to the Gulf of Mexico. The *Dixie Highway,* farther east, is to extend from the Great Lakes to the Gulf of Mexico, and the *Lincoln Highway* is to extend from the Atlantic to the Pacific. The *National Parks Highway* is projected between Chicago and the Pacific coast, through the states bordering on Canada. Besides the American Highway Association, organized in 1910, there are about 700 local associations, all interested in road improvements. As an evidence of the scientific character of the study now being made of the problem, it is interesting to note that about seventy colleges and universities offer instruction in highway engineering. W.F.Z.

Consult Gillette's *Economics of Road Construction;* Morrison's *Highway Engineering;* Judson's *City Roads and Pavements.*

Related Subjects. The following articles in these volumes may be consulted in connection with this discussion of roads and streets:

Asphalt
Cumberland Road
Dixie Highway
Highway
Lincoln Highway

ROANOKE, *ro'a nohk,* VA., an industrial city in Roanoke County, in the southwestern part of the state, and on the Roanoke River. Lynchburg is fifty-four miles east, Richmond, the state capital, is 199 miles east, and Washington, D. C., is 227 miles northeast, by rail. The Norfolk & Western and the Virginian railways enter the city, and an electric line is in operation to Salem, to the west. Big Lick was the name of the place when it was founded in 1852. In 1882 it received its present name and in 1884 it was chartered as a city. In recent years the growth has been remarkable. In 1880 the population was only 639; in 1910 it was 34,874, and it was 50,842 in 1920 (46 per cent gain). The city ranks third in the state, following Richmond and Norfolk.

Owing to its picturesque and healthful location in a valley between the Blue Ridge and the Alleghany Mountains and to medicinal springs in the vicinity, Roanoke has become noted as a health resort. The city has four recreation grounds, six hospitals, a sanitarium, and a hotel built on the mountain at an elevation of 2,100 feet and reached by an incline railway. Among the newer edifices of the city are a $250,000 city hall, a $150,000 Y. M. C. A. building and a $50,000 armory; it also has a Federal building, a courthouse, an academy of music and several fine business buildings. For higher education there are Virginia College, for women; Elizabeth and Roanoke colleges, both Lutheran, and Hollins Institute, for young ladies, under Baptist supervision.

Formerly Roanoke was a prominent tobacco center, but its chief interest now lies in iron mining and farming, the leading manufactories being dependent on the former industry. Bridges, structural steel and iron, agricultural implements, hydraulic engines and silos are among the important products; the large shops of the Norfolk & Western Railway (about 3,000 employees) are located here, and there are in addition tobacco and canning factories and bottling works. J.W.

ROANOKE RIVER, a river in North Carolina and Virginia. Some authorities apply the name to the stream formed by the union of the Dan and the Staunton rivers, and others consider the Staunton and the Roanoke to constitute one river, having the Dan as a tributary. If the latter view is taken the river may be said to rise in the Blue Ridge Mountains in Southwestern Virginia and to flow in a general southeasterly direction for 450 miles, emptying into Albemarle Sound. The Dan enters the stream at Clarksville, Va. For small boats the Roanoke is navigable for its entire length, for larger steamers as far as Weldon, N. C. At Halifax a dam has been built to supply the city with water power, and a canal has been cut around the dam to keep the river open to commerce. Plymouth, a town near the mouth, is a trade center for cotton, peanuts, rice and tobacco.

ROBBERY, *rob'er i.* Three men armed with revolvers entered a bank during business hours, intimidated the employees by threatening to shoot them if they offered any resistance, and took away with them several thousand dollars. Two men in an automobile met a farmer going to the city, overpowered him and forcibly took one hundred dollars from him. All these men were arrested, tried and convicted. Those who took the money from the bank were convicted of *robbery;* and the others of *highway robbery.*

In criminal law, *robbery* consists in taking from a person by violence or intimidation money or goods to any value whatever. Robbery is a crime classed as a felony (which see), and in all states and provinces it is punishable by imprisonment. The value of the property taken has but little influence in determining the penalty, except that it must be of some value to the person from whom it was taken. *Highway robbery* consists in robbing a person on the street or on a road.

Related Subjects. The reader is referred to the following articles in these volumes:

Burglary	Felony
Crime	Larceny
Criminology	Procedure

ROBBIA, *rohb'byah,* DELLA, the name of a family of Italian sculptors who flourished during the days of the early Renaissance.

Luca della Robbia (1399-1482) exercised his greatest influence as the founder of a school of sculpture in which the medium used was glazed or enameled terra cotta. "Robbia ware" became famous throughout all Europe. However, the secret of its invention never went beyond the Robbia family, and after the death of the last member no more was made. Luca della Robbia ranked with the best of his contemporaries in the production of beautiful forms, and he was distinguished for his work in marble and bronze, as well as for his reliefs in terra cotta. His Madonnas and saints made him the typical religious sculptor of his day.

Andrea della Robbia (1437-1528), the nephew of Luca, made a much wider use of terra cotta and carried the art into the smaller towns. He

adorned churches at Arezzo, Prato, Siena and Florence, but only his earliest work embodies the dignity which always characterized the achievements of his uncle. His five sons continued the activities of the family, but they contributed nothing to the development of art.

ROB'ERTS, Charles George Douglas (1860-), a Canadian poet and novelist, one of Canada's most versatile men of letters. Though he is best known for his poems and for his stories about animals, Roberts has been at various times a newspaper and magazine editor and a college professor. In his poems he shows imagination and artistic finish; in his novels he displays to excellent advantage his powers of description of natural scenery; and in his animal sketches reveals a remarkable knowledge of, and sympathy for, animals. The animals to him are all but human. His masterpiece in this field is *Red Fox.*

Roberts laid the scene of most of his literary productions in New Brunswick and Nova Scotia. He was born at Douglas, near Fredericton, N. B., was educated at the University of New Brunswick, and made his home in that province and in Nova Scotia for many years. He lived in Toronto from 1883 to 1884 as editor of Goldwin Smith's newspaper *The Week,* and from 1885 to 1895 taught in King's College (Windsor, N. S.), first as professor of English and French literature and later of English and economics. In 1897-1898 Roberts was associate editor of the *Illustrated American,* published at New York.

Of his poetry, probably the best is *Ave: An Ode for the Shelley Centenary,* a poem which is regarded as one of the finest ever written by a Canadian. His first published volume, which appeared when he was twenty, was *Orion and Other Poems. In Divers Tones, Songs of the Common Day, The Book of the Native* and *New York Nocturnes* are other volumes of verse. Of his many novels and sketches the following are most important: *The Raid from Beausejour; Around the Camp Fire; The Forge in the Forest; By the Marshes of Minas,* a volume of short stories; *The Heart of the Ancient Wood; The Kindred of the Wild; Red Fox,* already mentioned above; *Barbara Ladd,* an historical novel; *Neighbors Unknown; Feet of the Furtive,* and *Hoof and Claw,* these last three all being stories of animals. Roberts also wrote an excellent one-volume *History of Canada.*

For examples of his verse, consult *Oxford Book of Canadian Verse.*

ROBERTS, Frederick Sleigh, Earl of Kandahar, Pretoria and Waterford (1832-1914), a British soldier known affectionately throughout the world as "Bobs," was born at Cawnpore, India. Educated at Eton, the Royal Military College at Sandhurst and the East India Company's military college at Addiscombe, he received a commission in the Bengal artillery in 1851. For twenty-five years he served with the Indian army, becoming noted for his great military ability and genius in transporting and supplying troops, and became commander-in-chief in 1885. For gallantry in action at Khudajanj he obtained the much-prized award of the Victoria Cross. During his varied and efficient service in India Roberts performed a remarkable and memorable march to Kandahar. With a force of 10,000 men he marched 313 miles through hostile territory in twenty-two days and on the twenty-third day gained a complete victory over the rebels who besieged Kandahar, though his force was far outnumbered and had suffered terribly on the march. He was officially thanked by Parliament and created a baronet. For his further services while commander-in-chief in India he was raised to the peerage as Baron Roberts of Kandahar and Waterford.

After the opening disasters of the South African War (Boer War), in which Lord Roberts lost his only son, he was sent to Africa to take supreme command. Arriving at Cape Town in January, 1900, he quickly changed the aspect of affairs. War was carried into the enemy's country, Mafeking and Ladysmith were relieved, and Bloemfontein, Johannesburg and Pretoria fell into the hands of the British. The whole of Roberts' march through South Africa was a series of brilliant flanking movements avoiding the fearful loss of men due to the frontal attacks previously delivered. The war assuming a guerilla aspect, the command was handed over to Lord Kitchener, and Roberts returned to England where he was awarded an earldom, a grant of $500,000 and was made commander-in-chief of the British army.

On the outbreak of the European War in August, 1914, Lord Roberts, although then eighty-two years of age, was appointed to the command of the British expeditionary force during mobilization at Aldershot. He did not assume charge of the British columns on the Continent, that command being assigned to Sir John French and later to General Haig. In November of the same year Lord Roberts visited the battle front in Northern France; while

in camp with the troops from India he contracted a severe cold which developed into pneumonia, and within twenty-four hours he died, on November 14. F.ST.A.

ROBERTSON, JOHN ROSS (1841-), a Canadian journalist, founder of the Toronto *Evening Telegram,* which met with remarkable success from the beginning and became one of the leading papers of the Dominion. Robertson is also known for his high standing as a Mason, and has written histories of the Freemasons and of the Knights Templars in Canada. Robertson was born in Toronto, attended Upper Canada College, and after serving his apprenticeship as a reporter, and as editor of a weekly satirical paper which he founded, he was city editor of the Toronto *Daily Globe* from 1864 to 1866. He was one of the founders of the *Daily Telegraph,* which lasted only six years. Then from 1872 to 1875 he lived in London as correspondent for the *Daily Globe.* Returning to Canada in 1875 he assumed the business management of Goldwin Smith's *Nation,* but a year later established the *Evening Telegram.* In addition to his books on Masonry and his contributions to journalism, he wrote *Talks with Craftsmen* and *Landmarks of Toronto,* and edited the diary of Mrs. John Graves Simcoe.

ROBESPIERRE, *ro bes pyair',* MAXIMILIEN MARIE ISIDORE (1758-1794), one of the most celebrated of the French revolutionists, was born at Arras. He was educated in the college of Arras and the College Louis-le-Grand at Paris and after studying law in the latter city returned to Arras to begin a legal career. He speedily became known as a skilful advocate, a man of integrity and the possessor of a nature so kind that in 1782 he resigned a position as criminal judge rather than pronounce a death sentence. He was an enthusiastic student of Rousseau and at the approach of the French Revolution thought he saw an opportunity to establish the ideal society which Rousseau had described. He therefore began to speak for the liberal democratic views then popular among the French middle-classes, and when the States-General, or National Convention, met at Paris in 1789, he was sent as a representative.

ROBESPIERRE
The fate which he meted out to hundreds of Frenchmen overtook him.

He had back of him the enthusiastic support of the Jacobins, who believed in severe measures toward royalty, and these partisans saw to it that the common people heard often about his speeches and deeds in their favor. He became bold and bitterly opposed the policies of the Girondists, or believers in milder measures toward the nobility. After the storming of the Tuileries he was elected a member of the Commune of Paris, and his popularity with the common people gave that organization the strength to carry out its decrees. Then came the trial of Louis XVI, on January 1, 1793, in which Robespierre stood firmly and successfully for the death sentence, and thus gained the friendship of the radical revolutionist Danton, just then rising to power.

Four months later Robespierre helped to establish the Committee of Public Safety, and through its work gained ill fame which will doubtless follow him through all history. This committee resolved to crush all dissension at home so that a united country might face its foreign enemies, and to this end the "Terror," or reign of the guillotine, was established. To some extent Robespierre has been unjustly accused of inciting this period of violence. He had but two allies in the committee of twelve, and could not have dictated affairs. Moreover, whatever he permitted was for the purpose of ridding the country of the discontented, who might hamper the ideal society which he firmly believed was coming; while his companions on the committee saw in the wholesale butchery a thorough and rapid way of disposing of their own political enemies. Be that as it may, between June 12 and July 12, 1794, this organization sent to the guillotine nearly 1,300 people.

Meanwhile, even his political allies began to fear his power, and the Committee of Public Safety decided to make him the scapegoat for the butchery of the Terror. On July 26 he defended himself in such a forceful speech that the Convention voted to follow his suggestion of ceasing the wholesale execution, and placed no blame upon him for the record of the terrible weeks which had passed. The next day, however, his enemies rallied their forces and caused the Convention to declare him "outside the law," meaning, practically, an outlaw. During the attempt to arrest him at the Hotel de Ville, part of his jaw was torn away by a bullet, and

in this horrible condition he was brought before the Convention. Unable to defend himself, he was sentenced to the guillotine and was executed the next day, July 28, 1794.

His private life was clean, and his manners and tastes those of a gentleman. He was by nature a dreamer and an idealist, and only his oratory gained him his position as an executive. C.H.H.

Consult Warwick's *Robespierre and the French Revolution;* Belloc's *Robespierre.* A great novel dealing with the Revolution is Dickens' *Tale of Two Cities.*

Related Subjects. The following articles in these volumes will make clear certain references in this sketch of Robespierre:

Commune of Paris	Jacobins
Danton, Georges Jacques	Louis XVI
French Revolution	Mirabeau, Count de
Girondists	States-General
Guillotine	Tuileries

ROB'IN, a North American songster of the thrush family, called by John Burroughs "the most native and democratic" of American birds. The robins are so sociable and are seen in such numbers around our dwellings that they have

Each morning, when my waking eyes first see,
Through the wreathed lattice, golden day appear,
There sits a robin on the old elm tree,
And with such stirring music fills my ear,
I might forget that life had pain or fear,
And feel again as I was wont to do,
When hope was young, and life itself were new.
—WELLS: *The Old Elm Tree.*

never attained the reputation enjoyed by some of the more secluded birds of the woodlands. Yet, as one authority has said, "Let the robin hide in distant forests and reveal himself to a lucky few only, and there would be no bird that could excel his beauty, dignity or song." Robins are rather large birds, measuring about ten inches from beak to tail. Their plumage is attractive, the orange-red breast contrasting prettily with the olive-gray upper parts, brownish wings and black head. White markings are found on the throat and tips of tail feathers and below the tail. Except in the autumn, when male and female are much alike, the coloration of the female is duller than that of her mate.

These birds have a wide range, for they breed from Mexico to Alaska, and their winter migrations take them south to Guatemala. They are among the first birds to come back from the south, a fact which has given rise to the familiar sayings—"The robin has come and spring is here;" "Good luck to see him first on highest branch." While the birds are mating they fill the air in the morning and evening with joyous, ringing notes, which sound much like *cheerily, cheerily, cheerily.* Male and female labor together in building the nest, and a pair often returns to the same spot year after year. A favorite site is a crotch on a horizontal branch or a ledge about a barn or house. The nest is fashioned into a cup-shaped mold of straw, rags and paper, cemented with mud. Both birds share in the work of hatching the three to five blue eggs.

Robins are voracious eaters, and over half of their food consists of fruit. As they like wild berries better than the fruits of garden or orchard, the cultivated cherries and berries may be protected by the planting of wild shrubs near by. Their food includes also large numbers of insects and worms, and for this reason they are an aid to the farmer. Robins are protected from indiscriminate slaughter both in the United States and Canada (see BIRD, subtitle *Government Protection of Birds*).

The European robin, also called *redbreast,* is a smaller bird than the American, and of more brilliant plumage. It belongs to the warbler family. According to an old English legend, this "pious bird with the scarlet breast" mercifully picked a thorn from the crown of Christ as He was on His way to Calvary, and as the bird carried it in its beak, the blood dropped from the piercing point to its breast, dyeing it red. B.M.W.

Consult Lange's *Our Native Birds;* Beals' "Some Common Birds in Their Relation to Agriculture," in *Farmers' Bulletin No. 54,* United States Department of Agriculture.

ROBIN HOOD, a very popular hero of English legend. The old ballads describe him as an outlaw, living with his yeomen in Sherwood forest, in Nottinghamshire. He was the most virtuous and gentlemanly of outlaws, for he

never molested or permitted his men to trouble poor travelers, or any company in which a woman was present. On the contrary, he often shared with the needy the spoils which he took from his wealthier victims, for no rich knight, and even more surely no rich clergyman, passed through his forest domains without being robbed. The outlaws lived an out-of-door life, depending for food on the supplies taken from travelers and on the king's deer which they shot.

Whether or not such a character ever really lived has been a subject for much discussion. Scholars have written books which seemed to prove absolutely that Robin Hood did live, and which even gave the period of history when he flourished, but a rival scholar has also been able to advance very weighty arguments to show that he was not an historical character. Some authorities hold that the stories about him are in reality fairy stories, told about some woodland sprite, and that belief in his human existence grew out of this. The literature about him is extensive, for poems, stories, operas and dramas have been built around his exploits. The old ballads which gave the original account of him date back to the beginning of the fifteenth century, but references in literature show that the tales were current before that time. One ballad series, *A Little Geste of Robin Hood,* is among the earliest ballads ever written, but it is evidently a compilation of earlier short poems.

The famous outlaw has been much used as a character in modern writings: Scott introduces him as Locksley, in his *Ivanhoe;* Tennyson made him the central figure of a drama, *The Foresters;* Howard Pyle wove the old tales into his very successful *Merry Adventures of Robin Hood,* and Reginald De Koven used him as hero for the comic opera *Robin Hood.*

Probably the best edition of the tales of Robin Hood is Pyle's *Merry Adventures of Robin Hood.* Other recommended books are Creswell's *Robin Hood and His Adventures;* Finnemore's *The Story of Robin Hood and His Merry Men.*

ROBINSON, Sir John Beverley (1791-1863), a Canadian jurist and statesman, for many years the leader of the Tory party in Upper Canada, or, perhaps more accurately, the chief of that group of Tories which is known in history as the "Family Compact." Though his conservative tendencies have at times been allowed to overshadow his abilities, Sir John must be recognized as one of the most brilliant men of his day. He was a clever political leader, a good lawyer, and an eminent judge. During the quarter of a century for which he was chief justice of Upper Canada, not a single one of his decisions was ever reversed on appeal.

Robinson was born at Berthier, Quebec, of United Empire Loyalist stock. He attended Dr. Strachan's school for boys at Kingston, and was much influenced in his ideas on religion and politics by the future bishop. After leaving school Robinson studied law, and in 1812 was called to the bar. In the same year he served temporarily as attorney-general for Upper Canada, but at the outbreak of the War of 1812 he volunteered for service. At the close of the war, in 1815, he was appointed solicitor-general, and in 1818, attorney-general. He was attorney-general until 1829, and from 1829 to his death was chief justice of Upper Canada. In both these positions he wielded a powerful influence, which was uniformly thrown against the Reformers. Robinson, in fact, was the leading spirit among the Conservatives, or Tories. He opposed the legislative Union of 1841 as a temporary makeshift, but he strongly advocated a federal union of British North America.

ROBINSON CRUSOE, a story by Daniel Defoe, published in 1719. It is usually considered as the first English novel, in the modern sense of the term, and though it is almost two hundred years old, it has never lost its popularity. Founded on the adventures of Alexander Selkirk, who was shipwrecked and cast away on the island of Juan Fernandez, it gives a careful, circumstantial account of Crusoe's shipwreck and his method of life on an uninhabited island. Defoe was a master of realism, and his telling use of detail makes the story seem a genuine history. In a measure it has served as a model for romances of adventure ever since, and it remains one of the most fascinating boys' books ever written. It has been translated into various languages, and many simplified editions for children have been issued. There is a charm about Defoe's language and manner, however, which no translation in words of one syllable can attain.

For illustration of Selkirk monument and inscription, see Juan Fernandez, page 3177.

ROB'LIN, Sir Rodmond Palen (1853-), a Canadian statesman, for fifteen years premier of Manitoba, then, suddenly, in 1915, compelled to resign by the exposure of fraud and bribery among members of his government. His political opponents charged, with some show of evi-

dence, that Roblin knew about the graft and was even personally interested in it. The public scandal caused by the disclosures, which affected construction of the Parliament Buildings at Winnipeg, compelled Roblin's resignation from the premiership and subsequently led to his criminal prosecution.

Roblin was born at Sophiasburg, Prince Edward County, Ontario, and was graduated from Albert College, at Belleville. As a young man of twenty-seven, he removed from Ontario to Manitoba, where he became a farmer and grain merchant. He then took an active part in local politics, was reeve for five years and warden for two years of Dufferin, and in 1888 was elected as Conservative member of the Manitoba assembly. He became premier in 1900, succeeding Sir Hugh Macdonald. During his premiership of fifteen years, Manitoba made conspicuous industrial progress, due in a considerable degree to the policies of the Roblin government. Roblin was recognized as a strong advocate of Canadian industry, and opposed the Taft-Fielding reciprocity agreement of 1911. He was created a Knight Commander of the Order of Saint Michael and Saint George (K. C. M. G.) in 1912.

ROB ROY (1671-1734), a famous Scottish outlaw whose adventurous career is known to every reader of Scott's novel, *Rob Roy*. His exploits are also the theme of a popular light opera by Flotow. Rob Roy is sometimes called the "Robin Hood of Scotland," for both names have romantic and legendary associations (see ROBIN HOOD). This Scottish outlaw was the son of Donald Macgregor of Glengyle. His mother was a Campbell, and he was given the Christian name of Robert. When the Macgregor clan of Glengyle was outlawed the youth took his mother's family name, but he was always popularly known as Rob Roy. *Roy,* the Gaelic word for *red,* was applied to him because he had reddish hair and a florid complexion. He had a powerful physique, though he was not much above the average in height, and was widely known for his great strength and his skill in the use of the sword.

Having inherited land in the Highlands, Rob Roy began to raise cattle for the English markets, but he soon found it necessary to gather about him a band of armed clansmen to protect his herds from marauding outlaws. His own career of outlawry was the result of unwise speculations, for he was compelled to borrow money from his neighbor, the Duke of Montrose, and when the loan was not repaid the duke evicted him from his property and placed him under the ban. In desperation, Rob Roy organized a band of followers against the duke and his tenants, stealing both their cattle and their rent money. For a long time he evaded all attempts to capture him, but in 1722 gave himself up to the English authorities. He was imprisoned and sentenced to be transported (1727), but was pardoned and permitted to return to Scotland. There he spent the rest of his life.

Consult Macleay's *Historical Memoirs of Rob Roy* and introductory chapter of Scott's novel.

ROB'SON, MOUNT, the highest mountain in British Columbia. It belongs to that range of the Canadian Rockies which culminates in the region of the Athabaska and the North Saskatchewan rivers. It is 13,068 feet in altitude, and is situated not far from the boundary between British Columbia and Alberta (see map on page 934).

ROC, *rok,* a huge bird of Arabian mythology, believed to have dwelt in the vicinity of Madagascar. Sindbad the Sailor, in *The Arabian Nights' Entertainments,* came upon a roc's egg that was fifty paces round. When the roc appeared, her wings darkened the sun. Sindbad tied himself to one of her legs as she sat over the egg, and was carried away. There is, needless to say, no foundation in fact for these stories.

ROCHAMBEAU, *ro shahN bo',* JEAN BAPTISTE DONATIEN DE VIMEUR, Count de (1725-1807), a French soldier who did valiant service under Washington in the Revolutionary War in America. Born at Vendome, France, he was educated for the Church, but adopted the military profession instead, entering the army in 1742. In the War of the Austrian Succession he distinguished himself, and was appointed governor of Vendome in succession to his father. The Minorca Expedition in 1756 gave him further opportunities to gain distinction; the Seven Years' War in Germany also added to his reputation, and in 1780, with rank of lieutenant-general, he was sent at the head of 6,000 French troops to assist Washington

COUNT ROCHAMBEAU

against the British. For a year his army was kept inactive in Rhode Island, owing to the blockade of the French fleet by the British. In 1781, however, he joined Washington on the Hudson.

During the ensuing campaign he put himself under the orders of Washington and took part in the operations which culminated in the surrender of Cornwallis at Yorktown. Congress voted the thanks of the nation to Rochambeau and his troops.

Returning to France in 1783, he was appointed governor of Picardy and Artois and was made a marshal of France. Although in sympathy with the Revolution, the excesses of the leaders alienated him. He was imprisoned, and narrowly escaped the guillotine; his rank and estates were restored to him by Napoleon.

ROCHE, *roach,* WILLIAM JAMES (1860-), a Canadian physician and statesman, a member of the Dominion House of Commons since 1896 and after 1911 a member of the Conservative Borden Ministry. Dr. Roche was born at Clandeboye, Ont., and received his education at the London High School, Trinity Medical College and the University of Toronto. In 1883, after he had been admitted to practice, he removed to Minnedosa, Man., where he practiced medicine for years, and was also for a time a member of the Manitoba medical council. After 1896 he served continuously in the House of Commons. In 1911, on the formation of the Borden Cabinet, he became Secretary of State, and a year later was appointed Minister of the Interior and Superintendent of Indian Affairs.

ROCHEFORT, *rosh fawr',* VICTOR HENRI (1830-1913), a French journalist who repeatedly defied the authorities by his frank expression of radical political views. He was dropped from the editorial staff of the *Figaro* in 1866 because of his spirited attacks on the government of Napoleon III. Two years later he began a weekly paper of his own, *La Lanterne,* the radical policies of which brought him a prison sentence, but he escaped to Brussels. In 1869 he started another paper, *La Marseillaise,* and again was sentenced to prison. On the downfall of the Empire at the close of the Franco-German War (1871) he was pardoned and for a brief period served as a member of the government of national defense. Rochefort's opposition to Thiers, first President of the republic, caused him to be sent to the penal colony of New Caledonia, but in 1874 he escaped, and in 1880 was allowed to return to Paris. Thereafter he continued his career of a radical, liberty-loving journalist.

ROCH'ESTER, MINN., the county seat of Olmsted County, is situated in the southeastern corner of the state and on the Zumbro River, 107 miles southeast of Saint Paul, 346 miles northwest of Chicago and fifty miles west of Winona. Railway transportation is provided by the Chicago Great Western and the Chicago & North Western lines. The city is the headquarters of the Mayo brothers, world-famous surgeons (see MAYO, WILLIAM JAMES AND CHARLES HORACE). Rochester was settled in 1854 and was incorporated as a city in 1858. In 1920 the population was 13,722; Irish, Germans and Scandinavians predominate among the foreign born.

The country surrounding Rochester is a stock-raising and agricultural district which produces large quantities of wheat. The leading industrial plants are flour mills and gristmills; 1920 there were 41 factories, employing a total capital of $2,172,000. Rochester has a courthouse, a municipal building, Masonic Temple, Odd Fellows' Building, Rochester State Hospital for the Insane, the hospital conducted by the Sisters of Saint Francis (Saint Mary's), the Academy of Our Lady of Lourdes, and a public library.

ROCHESTER, N. Y., the county seat of Monroe County, is in the north-central part of the western extension of New York state, seven miles south of Lake Ontario and seventy-eight miles northeast of Buffalo. It is the third largest city in the state, ranking next to New York and Buffalo, with a population of 218,149 in 1910 and of 295,850 (Federal census) in 1920. Rochester has an area of over twenty square miles, almost equally divided by the Genesee River. Within the city limits this river descends 257 feet in falls and rapids. The highest falls, near the center of the city, drop ninety-five feet. From the northernmost bridge of the twelve which span the river within the city limits may be seen a magnificent gorge 200 feet deep, cut by the Genesee.

The Erie Canal crosses the city east and west and is carried over the river by a fine aqueduct costing $600,000. The New York State Barge Canal (which see) is reached by a branch canal five miles long. Railroad service is provided by the Erie, the Lehigh Valley, the New York Central, the Pennsylvania, the West Shore and the Buffalo, Rochester & Pittsburgh lines. The city also has electric-interurban service. The lake port of Rochester is Charlotte, at the

mouth of the Genesee River. Both passenger and freight boats make this port.

Parks and Buildings. Rochester occupies a fine, level site; the city is well planned and has many imposing public buildings. The largest parks are Durand-Eastman (484 acres), on the lake shore; Genesee Valley (538 acres), Seneca and Maplewood, all three along the river, and Highland Park. The city has two noteworthy monuments, one to soldiers and sailors, the second to a native son, Frederick Douglas, the distinguished negro orator. Prominent buildings are the Federal building, erected in 1891 at a cost of $600,000; the courthouse, a fine granite structure; the city hall, Y. M. C. A. building, Chamber of Commerce, state armory, Masonic Temple, Memorial Art Gallery, the public library and East and West high schools.

Institutions. The city has Rochester Theological Seminary (Baptist), Saint Bernard's Seminary (Roman Catholic) and Mechanics Institute. In addition to the public library, the city has the Reynolds and Law libraries. Benevolent, charitable and penal institutions include the General Homeopathic, Hahnemann and Saint Mary's hospitals, the Rochester State Hospital for the Insane, city hospital for contagious diseases, Iola Sanitarium for the treatment of tuberculosis, a large dental clinic, Monroe County almshouse, homes for aged persons and for orphans, and the county jail.

Industries. Rochester was once known as a foremost flour-milling city, the industry developing as a result of the great, natural water power at this place; but milling declined to a place of secondary importance with the development of the wheat fields of the Middle West in the vicinity of Minneapolis and Saint Paul. Other manufactures have proportionately increased, however; Rochester excels in the production of photographic apparatus and supplies, and is among the leading cities of the world in the manufacture of optical instruments, surgical instruments, thermometers, boots and shoes and men's clothing. Other important products are nursery stock,,shrubs and seeds, office systems, carbon paper, typewriter ribbon, woodworking and machine-shop products, electrical machinery, telephones and telephone appliances and railway-signaling devices. A local estimate of 1916 reported 326 factories, 10,000 operatives and an annual output valued at $25,000,000.

Rochester was settled in 1812, was incorporated in 1817 and became a city in 1834. The name was given in honor of one of the original landowners, Nathaniel Rochester.

ROCK, the solid portion of the earth's crust. The processes by which rocks were formed are described in these volumes in the article GEOLOGY. The formation of rocks from molten material is still going on, and may be seen wherever active volcanoes throw out lava, which solidifies in cooling. The rock envelope of the earth contains nearly all the known chemical elements, though only eight of them enter into the composition of rocks in such proportions as to require naming them. They are:

	Per cent		Per cent
Oxygen	74.02	Calcium	3.50
Silicon	28.06	Magnesium	2.62
Aluminum	8.16	Sodium	2.63
Iron	4.64	Potassium	2.32

Silicon is the basis of all quartz rock; aluminum is the basis of clay; calcium of limestone; and magnesium of all rocks containing magnesia. Each of these substances is described under its title.

As used in geology, the term *rock* means any solid portion of the earth. Sand and gravel are rock to the geologist. The term *stone* is applied to small, detached portions of rock, though very large masses are usually called *rocks.* Rounded stones which have been shaped by the action of ice or water are called *boulders.* These are frequently found long distances from the mass of rock from which they were broken, having been transported by ice.

According to their formation rocks are classified as *igneous, stratified* and *metamorphic;* according to their composition, as *granite, marble, quartzite, slate,* etc.

Related Subjects. The reader is referred to the following articles in these volumes:

Glacier
Igneous Rocks
Metamorphism
Stratified Rocks

ROCKEFELLER, *rok'e fel er,* an American family name that stands for brilliant achievements in the financial world. Three members of the family—two brothers and a son—are especially noteworthy; the elder brother, John Davison, is known everywhere as the richest man in the world.

John Davison Rockefeller (1839-) was born in Richford, N. Y., and educated in the public schools of that city and in those of Cleveland, O., whither his parents removed in 1853. The extraordinary business talents of the youth were early manifest, for at the age of nineteen he borrowed a thousand dollars and became head of a commission firm of his own—a venture that proved highly successful. Having entered into business connections with

Samuel Andrews, a prosperous oil refiner, in 1862, he organized the firm of Andrews, Clark & Company, beginning then to formulate the policy that was destined to earn him a huge fortune. This policy was the wiping out of competition in the oil field.

JOHN D. ROCKEFELLER

The world's only billionaire. Within recent years he testified in court that he did not know the amount of his wealth, for the reasons that it increased so rapidly and that values of stocks were constantly changing. In 1915 his riches were carefully estimated at over $900,000,000; in 1916, when unprecedented expansion in trade and rise of stock values occurred, owing to war demands for American goods, he became a billionaire.

The firm's name was changed to William Rockefeller & Company in 1865, when a younger brother was taken into partnership, and a new oil refinery, the Standard Oil Works, was built. Subsequent consolidations, involving the annihilation of competition in the oil industry throughout the country, resulted in the organization of the Standard Oil Company, in 1882. Though this gigantic corporation was technically dissolved in 1892, its affairs continued to be managed from a central New York office. Finally, in May, 1911, the United States Supreme Court ordered its complete dissolution on the ground that a combination in restraint of trade existed.

The chief organizer of this mammoth business retired from active labors in 1911, and thereafter devoted the greater part of his time to philanthropic enterprises which he had been developing for many years. In all, Rockefeller has contributed nearly $90,000,000 of his fortune to the public welfare. He has given $43,000,000 to the General Education Board for the purpose of aiding American schools and colleges to maintain high standards; the Southern Education Board has received about $1,126,000, to be used in the South. His gifts to the University of Chicago total over $23,000,000, and Harvard and Yale have each received $1,000,000. To Vassar have been donated a $100,000 building, 3,000 volumes on Greek art and literature and various gifts in money, and to Barnard College a fund of $1,375,000. The Rockefeller Institute for Medical Research, in New York, has been endowed with $1,825,000, and in 1913 the state legislature of New York incorporated Rockefeller Foundation (which see). On Christmas, 1919, he gave $100,000,000, the largest single gift in the history of the world by any individual or group of men, one-half to the general education board and one-half to the Foundation. See, also, Standard Oil Company.

John Davison Rockefeller Jr. (1874-), son of the founder of the Standard Oil Company, was born in Cleveland. After his graduation from Brown University (1897), he became an associate of his father in business, and became director in various large corporations. Philanthropy and religious work have claimed much of his time and interest; for several years he has taught a Sunday-school class in New York City that has one of the largest enrolments in the world. In 1913 he founded, near New York, an institution for the rescue and assistance of unfortunate women.

JOHN D. ROCKEFELLER, JR.

William Rockefeller (1841-), brother of John D., Sr., was born at Richford, N. Y. After engaging in the produce commission business he associated himself with his brother in oil refining at Cleveland, and between 1865 and 1911 was in charge of the New York business of the Standard Oil Company of New Jersey. He also had a share in the management of various banks and trust companies, railroads, mining corporations and gas and electric companies. B.M.W.

ROCKEFELLER FOUNDA'TION, the greatest philanthropic trust in the history of the world, incorporated in May, 1913, by the New York legislature. The original endowment, consisting of one hundred million dollars, the gift of John D. Rockefeller, was made to provide an income through which the "well-being of mankind" should be promoted throughout the world. In May, 1917, a new donation of $25,000,000 was announced. The numerous activities of the Foundation since its incorporation include the organization of a successful fight against the hookworm disease (see Hookworm); the establishment of a medical commission in China to extend medical education in that country and to raise the health standards of the people; the creation of a commit-

tee to study the relations between capital and labor.

The outbreak of the War of the Nations was the occasion for many new acts of mercy. Thousands of dollars were spent in Belgian relief work and in coöperating with the Red Cross Society. America's entrance into the great war was followed by several new donations, including $200,000 to the Rockefeller Institute for Medical Research for the establishment of the Carrel Hospital, where new methods of combating infection of wounds will be studied.

The Institute for Medical Research (see below) has been aided by regular donations amounting to over $2,500,000. Other institutions that are regular beneficiaries of the fund are the American Academy at Rome, the New York Association for Improving the Condition of the Poor, and the organized charity societies of New York and Brooklyn. To Wellesley College has been donated $750,000, and to Johns Hopkins Medical School, $350,000. In 1917 $2,000,000 was appropriated toward the establishment of a huge medical college in connection with the University of Chicago. The governing body of the board is a self-perpetuating body of trustees.

ROCKEFELLER INSTITUTE FOR MEDICAL RESEARCH, one of the most important agencies of the present day devoted to the interests of humanity, its special field being the prevention and cure of diseases that afflict mankind. The Rockefeller Institute was incorporated in 1901 in accordance with a pledge made by John D. Rockefeller that he would advance $200,000 to be used in preliminary work in medical research for the interest of "humanity and science." Subsequent gifts have brought the endowment up to $8,240,000, including grounds, buildings and equipment.

The first year's work of the Institute consisted in giving aid to various lines of research already established, but at the second annual meeting of the board of trustees it was decided to unite the most important lines of work in a central laboratory under the direction of a competent head. Dr. Simon Flexner, professor of pathology at the University of Pennsylvania, was chosen director, and in 1904, in New York City, the board began the erection of a splendid building in which to carry on the work of the Institute.

Under the present organization there are maintained departments of pathology, bacteriology, physiological and pathological chemistry, physiology, comparative zoölogy, pharmacology and experimental therapeutics. The Institute coöperates with many other bodies in practical investigation; with the Health Department of New York City it has made a study of the conditions governing the milk supply of that city, particularly with reference to the tenement children; and it has coöperated with various commissions appointed to investigate certain dangerous diseases. A hospital under the direction of the Institute was opened in 1910, where the different diseases that affect mankind are given the closest scientific study.

The records of the work accomplished by the Institute are collected in volumes of *Reprints* and published in numerous scientific magazines. The organization also has the care of the publication of *The Journal of Experimental Medicine.* Though established for research rather than instruction, the Rockefeller Institute is closely connected with the progress of medical education, because of its important discoveries in the field of medicine.

ROCK'ET, a form of fireworks which is sent flying through the air, releasing brilliant stars, clusters of many-colored sparks, or showers of gold and silver rain that are remarkably beautiful.

The *skyrocket* consists of a paper or cardboard cylinder with a pointed head, fastened to a light-weight stick that both balances and guides. There are also *winged rockets,* furnished with cardboard wings instead of a stick. The cylinder is packed with an explosive mixture, except for a hollow bore through the center. Here the heated gases collect when the rocket is fired, forcing their way downward and escaping through a small opening at the lower end. The rapid upward motion is the result of the reaction of the air on this escaping gas. The rocket is like a small cannon, but it is so light and the charge so heavy that the backward pressure exerted through the recoil is much greater in proportion than when a cannon is fired. By the time the body of the cylinder is burned out the rocket has reached its greatest height. The fire is then communicated by a fuse to the pointed head containing the material that, when ignited, produces stars and sparks.

Rockets serve not only for ornamental fireworks, but for signaling, both in the army and in the navy. A signal of distress at sea may be given by firing single rockets at short intervals. The life-saving service likewise employs rockets for carrying life lines, particularly

where great range is needed, or in very rocky places which are dangerous for lifeboats to approach. See FIREWORKS.

ROCKFORD, ILL., a manufacturing and distributing center in the northern part of the state, and the county seat of Winnebago County. It is situated near the northern state line, about midway between its eastern and western borders and on both banks of Rock River. Chicago is eighty-five miles southeast; Dubuque, Iowa, is ninety-five miles west and north; and Beloit, Wis., is eighteen miles directly north. The city is served by the Chicago & North Western, the Illinois Central, the Chicago, Burlington & Quincy, and the Chicago, Milwaukee & Saint Paul railroads. Interurban lines extend north, east and west from the city. Rockford was settled by people from New England in 1834, was plotted in 1836 and became a city in 1852. Swedes predominate among the foreigners, who comprise about one-half of the total population. In 1910 the population was 45,688; in 1920 it was 65,651 (45 per cent gain). The area was enlarged considerably by the annexation of suburbs in 1890, and now exceeds nine square miles. The city is one of the largest in Illinois which prohibit the sale of liquors. After the entrance of America into the War of the Nations a large area near the city was selected to be the site of one of the great camps for training the new national army.

Rockford is known locally as the *Forest City,* because of its magnificent old trees. It is a beautiful city, the attractiveness of which is enhanced by the Rock River. This stream also contributes largely to its industrial importance. Several railroad and highway bridges span it at this point, and a dam 800 feet long provides ample power for manufacture. Artesian wells supply drinking water. Rockford has one of the largest plants in the United States for making gas stoves exclusively, and its furniture, harness, saddlery, hosiery and farm-implement factories have high rank among establishments of their kind; about 10,000 men are employed in three of the largest plants.

The important buildings include the Winnebago County courthouse, the city hall, the Federal building, erected at a cost of about $130,000; Rockford Library, the gift of Andrew Carnegie, the Elks' Club, East Side Inn, G. A. R. Memorial Hall, the Y. M. C. A. building, the American Insurance Building, and several bank, business and retail-store buildings. There are forty-three churches, three sanitariums and three hospitals, the most noted being Saint Anthony's Hospital. In addition to the public schools the city has Rockford College for Women, and Our Lady of Perpetual Help and Saint Mary's seminaries. Mandeville House, said to be the oldest house in Winnebago County, is a feature of interest in Mandeville Park.

ROCK ISLAND, ILL., the county seat of Rock Island County and a commercial center of importance in its territory, is situated on the northwestern border of the state, on the Mississippi River at the point where it receives the waters of the Rock River, and on the Hennepin Canal. Chicago is 180 miles slightly northeast, by rail. Railway transportation is provided by the Chicago, Rock Island & Pacific, the Chicago, Burlington & Quincy, the Chicago, Milwaukee & Saint Paul, the Davenport, Rock Island & Northern and the Rock Island & Southern. Steamers connect with all important ports on the Mississippi River, and an electric line operates to adjacent towns north and east through Moline. In 1910 the population was 24,335; in 1920 it was 35,177, a gain of 45 per cent. The area of the city is nearly six square miles.

Rock Island, Davenport and Moline, known locally as the *tri-cities,* are as one community socially and commercially. Rock Island was named for a near-by island in the river (sometimes called Government Island) and is connected with Davenport on the opposite bank by a bridge across the island, which was constructed by the United States government at a cost of $1,000,000. Other bridges connect Moline with the island, and the city of Rock Island directly with Davenport. On the island, which is three miles long and composed largely of limestone, the United States government, at an expense of about $10,000,000, has erected an arsenal and armory covering nearly 1,000 acres and employing about 2,500 men.

The Federal government has also constructed a dam here, which furnishes immense water power to the tri-cities, and has largely contributed to the development of this important manufacturing center. Rock Island is noted primarily for making agricultural implements, but the output of stoves, building materials, plumbing specialties, oilcloth and carriages is extensive; the railway car shops here employ about 500 men. The principal buildings are the arsenal buildings, a $175,000 courthouse, Saint Anthony's Hospital and some fine office

buildings. Besides the public schools, with a fine high school which cost $125,000, the city has Augustana College, Visitation Academy and an excellent public library.

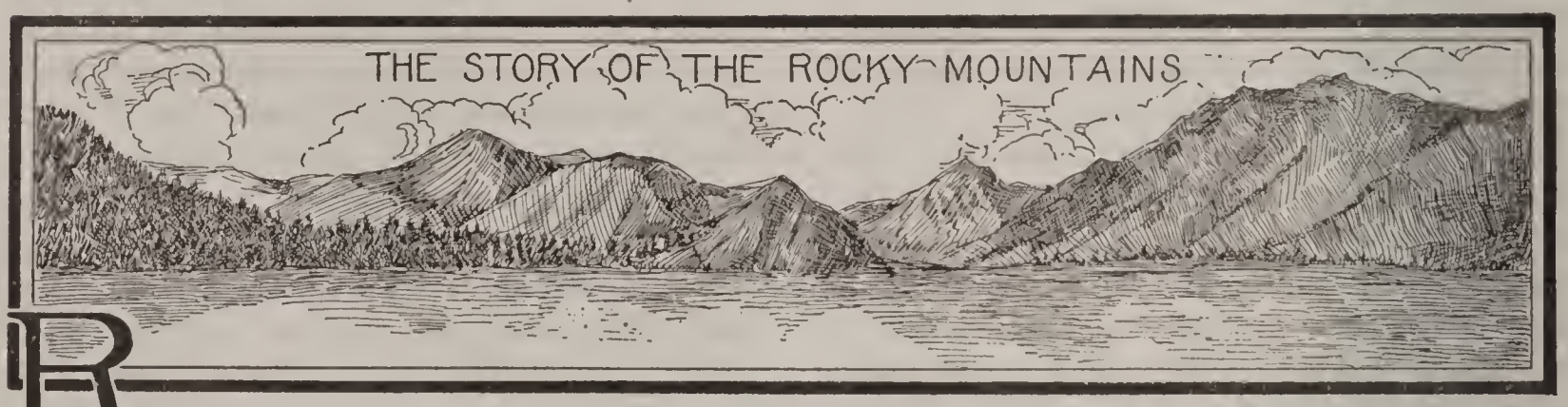
In 1816, Colonel George Davenport established Fort Armstrong on the site of Rock Island, and in 1826 he made the first settlement. It was organized as Stephenson in 1835, and in 1841 it was consolidated with Farnhamesburgh, under the present name. In 1849 it became a city and is now governed on the commission plan. In 1918 the city adopted prohibition, putting nearly fifty saloons and thirty wholesale liquor houses out of business.

ROCKLAND, a town in Russell County, Ontario. It is on the Ottawa River, and on the Grand Trunk and Canadian Northern railways, twenty-three miles by rail east of the city of Ottawa. It has some manufacturing interest, including a mica factory, sash-and-door factory, lumber and planing mills, but it is best known as a summer resort. Population in 1911, 3,397; in 1921, 3,495.

ROCK RIVER, a river about 325 miles long, which rises in the southern-central part of Wisconsin, flows southwest and joins the Mississippi near the city of Rock Island, Ill. Because of swift rapids it is of no importance to navigation, but furnishes excellent water power to the cities situated on its banks. Among these are Watertown, Janesville and Beloit, in Wisconsin, and Rockford, Sterling and Dixon, in Illinois. The country through which the river flows contains much picturesque scenery. At Janesville there is a huge rock jutting into the water, on which Black Hawk is said to have made his last speech to the Indians (see BLACK HAWK).

ROCK SALT. See SALT.

ROCKY MOUNT, N. C., a commercial center in the northeastern part of the state, situated on the dividing line between Edgecomb and Nash counties, and on the Tar River. It is sixty-eight miles northeast of Raleigh, the state capital, and 124 miles north of Wilmington, by the Atlantic Coast Line Railway. Rocky Mount is a tobacco and cotton market, and its chief manufactures depend on these products. Besides hosiery and tobacco factories and lumber mills, it has the large machine and repair shops of the Atlantic Coast Line. The city has a Federal building, erected in 1905 at a cost of $100,000, a high school, a business school and three hospitals. In 1910 the population was 8,051; it had increased to 12,067 (Federal estimate) by 1916. G.K.H.



ROCKY MOUNTAINS. Most of us, when we think of the Rocky Mountains, picture to ourselves the whole western edge of North America, from the point where the first peaks tower above the Great Plains to the abrupt shores of the Pacific. We may, also, consider the Rockies as the North American half of the Cordilleran chain, which extends from Cape Horn to the Arctic Circle, and of which the Andes form the South American half. But geographers, when they refer to them, include in the Rocky Mountains only the easternmost range of the northern Cordilleras, the wall of granite which begins near Vera Cruz in Mexico and passes north and west through Texas, New Mexico, Colorado, Utah, Wyoming, Idaho, Montana, Alberta, British Columbia and the Yukon to Alaska. They do not include the western Sierra Madre in Mexico, the Sierra Nevada, Cascade and Coast ranges in the United States, nor the Coast, Gold and Selkirk mountains in Canada.

In Mexico. At their southern end the Rocky Mountains touch the eastern coast of the continent, their steep slopes rising almost directly out of the Gulf of Mexico. Here in the tropics is the tallest peak in all the Rockies, the snow-tipped cone of Orizaba, whose summit is more than 18,000 feet above the near-by sea. North of it the range marks the eastern boundary of the great Mexican plateau; it is low, and is broken in many places.

In the United States. The engineers of the first railroad to the Pacific, searching for a

place where they could carry their tracks across the Rockies without encountering heavy grades, found in the southern part of Wyoming a plateau over 250 miles long and 100 miles wide running through the mountains from east to west at a height of 7,000 feet. This plateau, called the Laramie Plains, divides the Rockies of the United States into two distinct parts. To the south of it comes first the highest and broadest section in the whole Rocky Mountains system, covering Colorado and Eastern Utah; then come the lower and less compact ranges of New Mexico and Texas. In Colorado alone there are almost fifty peaks over 14,000 feet high; in Utah and New Mexico ten exceed 13,000 feet, and in Texas one mountain, El Capitan, is 9,020 feet in height. Above the Laramie Plains the Rockies extend toward the northwest, and are narrower and slightly lower. Wyoming has half a dozen peaks more than 13,000 feet high, but Idaho and Montana have each only one summit above 12,000 feet.

The Canadian Rockies. Sometimes people who have never before seen mountains exclaim with disappointment, after passing through the Rockies, that mountains were not at all what they had expected. Such a feeling is aroused by the fact that usually where the tallest peaks are, there also are the highest plains and plateaus. If these plains surround a mountain at half its height, its visible mass is only about one-eighth as great as if it rose directly out of the sea. In the Canadian mountains travelers find all their dreams of the Rockies fulfilled. There are dozens of peaks more than 11,000 feet high, several more than 12,000 and one, Mount Robson, over 13,000 feet high, yet the Canadian Pacific Railway crosses the continental divide at an altitude of only 5,332 feet and the Grand Trunk Pacific and Canadian Northern, when at their highest points, near the foot of Mount Robson, are only 3,726 and 3,712 feet above the sea. The principal peaks of the Canadian Rockies are in British Columbia, and toward the north the range gradually decreases in height until at the Arctic Circle it is only a series of hills.

What Made the Rockies. The Rocky Mountains are too long a chain to be alike throughout their length. In general, of course, their existence is due to pressure from east and west by the mighty forces of nature, which has lifted to this continental backbone rocks containing skeletons of animals that once lived in the sea, and other rocks formed by the intense heat of the earth's interior. In the southern half some of the mountains were once volcanoes, and evidences of volcanic activity are found in the huge lava sheets of Montana and Idaho and the geysers of Yellowstone National Park. But the shape of the Rockies as we now see them is the work of nature's never-resting carvers, the wind, the rain and, from Colorado northward, the glacier. It is they that have hollowed out the valleys and worn away the softer layers of rock, revealing to geologists the history of the mountains and exposing to prospectors and miners rich treasures in gold, silver, copper and coal. C.H.H.

Consult Parkman's *The Oregon Trail;* Hornaday's *Campfires in the Canadian Rockies;* Johnson's *Highways and Byways of the Rocky Mountains.*

ROCKY MOUNTAINS PARK, in Alberta, a national playground for the Canadian people. The park, covering an area of about 2,000 square miles, lies on the eastern slope of the Rockies. It was set aside as a reservation by Act of Parliament in 1887, the first Dominion park. In 1911 Parliament provided for the reservation of a larger area, the Rocky Mountains Forest Reserve, of which the old park became a part for some purposes, although it still retains its identity as a national park. The new reserve, covering an area of 20,896 square miles (13,373,000 acres), extends northward from the United States boundary for a distance of 500 miles, and is from twelve to one hundred miles wide. It covers an area about as large as the province of Nova Scotia, or about one-twelfth of the entire province of Alberta. In this vast territory animal and plant life is protected. Firearms are prohibited, and visitors must conduct themselves so that the peace of the park is not disturbed.

The heart of the Rocky Mountains Forest Reserve is Rocky Mountains Park. Here are many of the loveliest spots in all the world. The Dominion government and the Canadian Pacific Railway have combined to make these spots easily accessible and yet have not destroyed their charm. The park is under the control of a superintendent, who is responsible to the chief of the Dominion Parks Branch of the Department of the Interior.

Banff, "Capital" of the Park. To thousands of visitors, and to many thousands more who have heard of its wonders, the park means Banff. This little settlement, which exists for the benefit of tourists, is the extrance to the park. Here the visitor may recline luxuriously on a hotel veranda, overlooking the valleys of

the Bow and the Spray rivers. Within easy reach are gentle climbs and gorgeous vistas, as well as challenging peaks which will try the nerve of the most experienced Alpine climber. From Banff, either afoot or with horses, the tourist may visit dozens of interesting and attractive spots.

At Banff, near the junction of the Bow and the Spray, are the pretty Bow Falls. Here the banks of the Bow are fringed with superb trees, whose green is heightened by the dark mass of Mount Edith, beyond them. Mount Edith is 9,154 feet high, and is a fair test of the climbing ability of an Alpinist. South of the Spray and west of the Bow is Rundle Mountain, 9,798 feet high, whose precipitous eastern slope is one of the striking features of the landscape. Another pretty elevation is Sulphur Mountain, the culmination of a long, wooded ridge north of Banff. It takes its name from the hot sulphur springs on its slope. A short distance below the springs is the club house of the Canadian Alpine Club, and on the summit is a little observatory from which a beautiful bird's-eye view may be obtained.

There are many other points to see at Banff. There is Buffalo Park, in which buffalo, elk and moose may be seen living practically in their natural state. There are beautiful drives up the Spray valley, past old lumber camps and through forests to the Spray Canyon. Another drive goes to the Sun Dance Canyon. There are lovely lakes—the Spray lakes, the Sawback lakes, Vermilion and Minnewanka. Minnewanka is very deep and walled in by high cliffs. Trout fishing is best in the Sawbacks, but there is good sport on all of them. The Cave and Basin, about a mile from Banff, are a remarkable rock formation from which gush natural sulphur springs; there the Canadian government has built a fine swimming pool. Near by are the Hoodoos, strange, fantastic masses of rock, somewhat like those in the Garden of the Gods in Colorado.

Lake Louise. Although Banff is the entrance to the Rocky Mountains Park, it must divide honors for beauty with Lake Louise, "the Pearl of the Rockies," which lies in the western part of the park, near the British Columbia boundary. Not only is Lake Louise beautiful, but on all sides are landscapes of unforgetable grandeur. Exquisite coloring, always changing, somber forests and gleaming glaciers, sullen rocky slopes and bright, snow-capped peaks, all together are mirrored in the waters of the lake. See LOUISE, LAKE; PARKS, NATIONAL. W.F.Z.

ROCKY MOUNTAIN WHITE GOAT, a habitant of the high summits of the American and Canadian Rockies, belonging to the goat antelope family. It has a pure white, silky coat, small black hoofs, and slender black horns which curve backwards, and it is about three feet high at the shoulders. The animal lives for the most part high above the timber line,

ROCKY MOUNTAIN WHITE GOAT

midst snow and glaciers, where its white coat is an excellent means of protection. It feeds on the grasses that are found along the edges of the glaciers. Hunters often track these goats by following their trails, for they usually keep to the trodden paths. Not only is their flesh palatable, but their skins are valued for making rugs.

RO'DENTS, or **RODENTIA,** *ro den' shi a,* an order of mammals whose distinguishing characteristic is the possession of teeth especially adapted for gnawing. These teeth are large, curved, deeply rooted incisors, and there is one pair in the front of each jaw. They are peculiar in that they grow continuously from the roots, but wear away at the tips; as the front surfaces alone are protected by enamel, the teeth wear faster at the back, and so a sharp, chisel-like edge is developed. For this reason these animals can gnaw through very hard substances. Canine teeth are totally absent. Rodentia show considerable variation in size; the smallest rodent is the mouse, and the largest the capybara, a South American aquatic animal that grows to be four feet long. In habits there is even greater variety, for some live in burrows, as gophers, prairie dogs and marmots; some have nests in the woodlands and meadows, as field mice; some live in trees, as squir-

rels; and the muskrats and beavers can live in water. One species of squirrel can fly. Most rodents are covered with fur, but the porcupine has a covering that is truly a "coat of mail," for mingled with the coarse hairs on its back and sides are numerous stiff, barbed spines. Rodents are found in practically all parts of the world, and they constitute the largest order of mammals.

Consult Gregory's *The Order of Mammals;* Osborn's *The Age of Mammals.*

Related Subjects. The most important of these animals are described in these volumes. A list follows:

Agouti	Hedgehog
Bandicoot	Jerboa
Beaver	Lemming
Chinchilla	Marmot
Chipmunk	Mouse
Deer Mouse	Muskrat
Dormouse	Pika
Flying Squirrel	Porcupine
Gopher	Prairie Dog
Ground Hog	Rabbit
Guinea Pig	Rat
Hamster	Squirrel
Hare	Vole

RODIN, *ro daN',* Auguste (1840-1917), the greatest French sculptor of his age. His theory that nature should be the artist's one source of inspiration, and that only those creations which possess no character are ugly in art, has been consistently applied throughout his career. Rodin was born in Paris, and in that city received all of his not very extended schooling. His genius flowered early, as one of his finest pieces, a head entitled *Broken Nose,* was modeled when he was only twenty-two. For several years after the Franco-German War, during which he was a member of the National Guard, he worked and studied in Brussels.

Rodin's famous *Age of Bronze,* which created a sensation because of its daring realism, was exhibited in 1877 in the Paris Salon. Then followed a bust of Saint John (now in the Metropolitan Museum, New York), *Saint John Preaching, The Thinker* (see accompanying illustration), *Adam and Eve* (also in the Metropolitan), the monument to the six *Bourgeois de Calais, The Kiss,* the *Danaid,* the *Bather* (Metropolitan) and many other works, including busts of several noted men. In 1914, when the war in Europe broke out, Rodin's studio, the Hôtel Biron, was taken over by the government and converted into a day nursery. The aged sculptor, finding no haven in troubled France for creative work, went over to London. As a token of his appreciation of the kind welcome accorded him by the English people, he presented to the Museum of Victoria and Albert eighteen of his finest pieces of sculpture.

Consult Mauclair's *Auguste Rodin* (translation by Black).

"THE THINKER"

One of the most remarkable of modern works of art.

ROE, *ro,* Edward Payson (1838-1888), an American novelist and clergyman, born in Orange County, N. Y. He was educated at Williams College and at Auburn and Union Theological seminaries, served as a chaplain during the War of Secession, and then held the Presbyterian pastorate at Highland Falls, N. Y. Resigning this, he moved to Cornwall-on-Hudson, where he devoted himself to lecturing, writing and fruit culture. He wrote a long series of stories, of which great numbers were sold. They were almost as popular in England as in America, and some were translated into German. However, none of them possesses any special literary merit, and all follow the same traditional form of the novel. *The Opening of a Chestnut Burr* was probably the most popular. *Barriers Burned Away* has its climax in the great Chicago fire, and *The Earth Trembled* contains a description of scenes in Charleston, S. C., during the earthquakes of 1886. *He Fell*

in Love with His Wife is another of his best-known stories.

ROEBUCK, *ro'buk,* also called Roe Deer and Roe, a European member of the deer family, one of the smallest of that race. It is a graceful, agile animal, with a long neck, slender legs and a very short tail. Its summer coat is fox-red above and white beneath, but in winter this changes to a grayish-fawn color, with a white mark on the rump. The male is about twenty-seven inches high at the shoulder, and has upright antlers with two main forks. Roe deer are still found wild in sparsely-settled regions in the temperate parts of Europe, but are far less abundant than formerly. Both males and females are called *roes.*

THE ROEBUCK

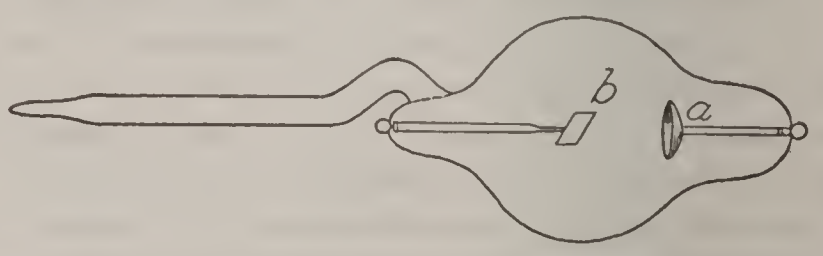
ROENTGEN, *runt'gen,* Wilhelm Konrad (1845-), a German physicist and inventor, born at Lennep, Prussia. He studied at Zurich and Utrecht, became assistant professor at Strassburg in 1873, and was then professor successively at Hohenheim, Giessem, Würzburg and Munich. His fame rests on his discovery at Würzburg, in 1895, of Roentgen rays (which see), commonly known as X-rays, which have practically revolutionized surgery. For this discovery he was given the Order of the Royal Crown by the German emperor and the title of baron by Prince Ludwig of Bavaria. In 1900 Columbia University awarded him the Barnard Medal for the greatest discovery in science during the preceding five years. He was also awarded the Rumford Medal of the Royal Society of London.

ROENTGEN RAYS, or **X-RAYS,** the name given a peculiar radiation discovered in 1895 by Professor Wilhelm Roentgen, of the University of Würzburg, while he was experimenting with Crookes tubes. Roentgen gave the name X-rays to these radiations because he did not understand their mechanism. They were afterwards named *Roentgen* rays, in honor of the discoverer.

The apparatus for producing Roentgen rays consists of a glass bulb in which nearly a perfect vacuum has been produced, and having a concave cathode (negative) metallic plate (*a* in illustration) and a flat platinum anode (positive) plate (*b*) placed at the focus of the concave plate and inclined to it at an angle of 45°. When a strong electric current is passed through the bulb the cathode rays fall upon the platinum plate, and from this plate the Roentgen rays pass through the walls of the bulb.

X-rays are invisible, and can be detected only by their effects. They are not reflected, refracted or polarized like ordinary rays of light. They possess the remarkable power of passing through many substances that are opaque to light rays, and of being absorbed by certain transparent substances. They will not, for instance, pass through glass, but will pass through muscular tissue. For this reason their discovery has revolutionized surgery. Compounds of borium, calcium and platinum become self-luminous when exposed to X-rays, and if an object opaque to these rays is placed between a screen coated with one of these substances and an X-ray tube, its shadow will appear on the screen. Since the bones absorb more of the rays than the flesh the shadow of the hand thrown upon the screen shows the bones.

Uses of X-Rays. An X-ray photograph is made by laying the object on the sensitized surface of a photographic plate and exposing the plate to the rays. Surgeons make use of



X-rays for locating foreign objects, such as needles and bullets, that have penetrated the body, and for determining the character of fractures and dislocations. X-rays are also employed in the treatment of certain forms of cancer. Sometimes physicians employ X-ray apparatus for observing the beating of the heart. When the skin is exposed too long to the rays they produce an effect similar to a burn. The apparatus should therefore be used only by experienced operators.

Consult Williams' *The Roentgen Rays in Medicine and Surgery;* Thompson's *Light, Visible and Invisible;* Bragg's *X-Rays: How to Produce and Interpret Them.*

Related Subjects. The reader is referred to the following articles in these volumes:

Cancer
Cathode Rays
Crookes Tubes
Roentgen, Wilhelm Konrad

ROGATION, *ro ga'shun,* **DAYS,** in the Roman Catholic Church, the Monday, Tuesday and Wednesday before Ascension Day (which see). On these days prayers known as the *litanies* are appointed to be sung or recited by the priests and people in public procession. The week in which the days occur is sometimes called *Rogation Week.* The name comes from the Latin *rogare,* meaning *to ask,* and the equivalent Greek word means *litany.* See LITANY.

ROGERS, *roj'erz,* JOHN (1829-1904), an American sculptor who became widely known for his clay models of groups representing typical scenes in American life and history. Of his many popular statuettes none is a greater favorite than his *John Alden and Priscilla.* The reader will find a reproduction of this attractive piece of work on page 1616, in connection with the article COURTSHIP OF MILES STANDISH. Other popular figures are his *Charity Patient, Going for the Cows* and *The Town Pump.* Rogers was born at Salem, Mass. His art studies were pursued in Rome and in Paris, and his first work of importance was the *Slave Auction,* exhibited in America in 1860. Several war groups followed, including the *Picket Guard* and *Union Refugees.* In some of his historical statuettes will be found portrait studies of Lincoln, Grant, Whittier and other famous men. Many of his clay figures have been copied in bronze, and he used this metal for his more elaborate figures, notably an equestrian statue of General Reynolds, in front of the Philadelphia city hall. The Metropolitan Museum possesses several good examples of his groups in bronze.

ROGERS, RANDOLPH (1825-1892), an American sculptor, famed for his memorial and symbolic monuments. He designed and modeled the bronze doors for the Capitol at Washington, which illustrate the life of Columbus, and he executed a great statue of Lincoln for Philadelphia, a statue of the *Genius of Connecticut* for Hartford, a colossal *America* for Providence, R. I., a figure representing the state of Michigan for Detroit, and the figures of Marshall, Mason and Nelson for the Richmond (Va.) Washington Monument. His *Nydia, the Blind Girl of Pompeii* (Art Institute, Chicago) and the *Boy with Dog* won him wide popularity. Rogers was born at Waterloo, N. Y., but passed his boyhood in Ann Arbor, Mich. He studied art in Rome under Bartolini and other sculptors, and from 1885 until his death he lived in Italy. The University of Michigan possesses a complete collection of casts of his works.

ROGERS, ROBERT (1864-), a Canadian statesman, after 1912 Dominion Minister of Public Works. He was born at Lakefield, Que., and was educated at Lachute Academy and at Montreal. In 1881 he went to the Northwest, and for some years made his home at Charlevoix, Man. He prospered as a grain dealer, and later became interested in mines and various industrial enterprises. Taking active part in the affairs of the Conservative party, he was president of the party's provincial convention in 1891, and in 1896 was an unsuccessful candidate for the House of Commons. From 1899 to 1911 he sat in the Manitoba provincial assembly, from 1900 to 1911 also serving in the Roblin Ministry, first without portfolio and later as minister of public works. In 1911 his activities were transferred to a new field, for he was appointed Dominion Minister of the Interior and was elected to the House of Commons. A year later he became Minister of Public Works, a position for which his long experience in the Manitoba government made him especially qualified.

ROHLFS, *rohlfs,* ANNA KATHARINE GREEN (1846-), an American novelist, born at Brooklyn, N. Y. While she was still an infant her family moved to Buffalo, N. Y., and there and in Ripley Female College, Poultney, Vt., she was educated. Her short stories began to appear in magazines while she was still a schoolgirl, and her first novel, *The Leavenworth Case,* was published when she was twenty-two years old. This book is a detective story, very much on the order of the famous Sherlock Holmes stories of Conan Doyle, and is still admired for the ingenuity of its plot and for the ability with which a case is established against a criminal by bits of insignificant circumstantial evidence. The author married an actor, Charles Rohlfs, in 1884, and soon after their marriage her husband turned the novel into a drama and produced it with great success. Other of the more important books by Mrs. Rohlfs, all of the detective order, yet wholesome in their influence, are *The Sword of Damocles, Marked "Personal," The Millionaire Baby, The Woman in the Alcove, The House of Whispering Pines, The Mayor's Wife, Three Thousand Dollars* and the *Golden Slipper and Other Problems for Violet Strange.* These stories are filled with dramatic incidents, and this characteristic, together with their well-woven plots, has made those which have been dramatized even more successful on the stage than was *The Leavenworth Case.*

ROHLFS, Friedrich Gerhard (1831-1896), an explorer and writer, born at Vegesack, near Bremen, Germany. He was educated in the medical departments of the universities of Heidelberg, Würzburg and Göttingen. Between his school and university courses he had served with distinction in the German army; therefore, when Rohlfs became an explorer of Africa in 1860, he entered the work with a reputation for ability, bravery and endurance. During his travels in Morocco he so thoroughly mastered the Arabic language that he was able to pass himself as a Mussulman and thus easily investigated the whole country. He explored the Sahara Desert, visited the then almost unknown section of Tafilet, Africa, afterwards passed on to Murzuk, in the interior, and again across the Sahara to Bornu. Many times he traveled in Africa where no white man had been before. In 1868 he explored Abyssinia and brought back valuable maps of the country.

He married in 1870 and tried to lead a domestic life, but the longing for adventure was so strong that in 1873 he returned to Africa to explore the Libyan Desert. During the next twelve years he led other parties into the Sahara Desert and Abyssinia, and had several thrilling escapes from the savage natives. In 1885 Bismarck appointed him consul at Zanzibar, in the hope of strengthening Germany's claim to the island; but the explorer was not trained in diplomacy and was soon recalled. His last days were spent near Bonn, Germany. Among his books which have been of value in geographical study should be mentioned *Travels in Morocco, Land and People of Africa* and *Travels in Tripoli.*

ROJESTVENSKY, *ro jest ven'ski,* Sinovi Petrovich (1848-), a Russian naval officer, commander of the Baltic fleet which, during the Russo-Japanese War, was defeated in the great Battle of the Sea of Japan by the Japanese on May 27 and 28, 1905. He fought in the Russo-Turkish War of 1877-1878, and took part in the Chino-Japanese War (1894) as second in command to General Alexieff. He was made rear-admiral in 1902, and was given command of the Baltic fleet two years later. In October, 1904, while conducting this fleet to Vladivostok, during the Russo-Japanese War, he incurred the wrath of England by firing on some British fishermen on the Dogger Bank in the North Sea, whom he mistook for the enemy. As a result of the incident Russia was for several days on the verge of war with England. The Japanese commander, Togo, prudently awaited the Russian fleet in home waters, and on May 27 a great naval battle began near the Tsushima Islands, in the Sea of Japan. In a two-days' fight nearly the whole Russian fleet was captured or sunk. Rojestvensky was wounded but was rescued, and over 4,000 of his men were captured by the Japanese.

ROLAND, a celebrated hero of French romances of chivalry, known in Italian romances as *Orlando.* According to the generally accepted legend he was the nephew of Charlemagne, in whose army he fought against the Saracens in Spain. When the army crossed the Pyrenees into France, Roland remained behind with the rear guard, and at Roncesvalles was set upon by the Saracens, defeated and killed. His friend Oliver besought him in the early stages of the battle to blow a blast upon his horn and bring the forces of Charlemagne to his aid, but he refused; and only with his last breath did he sound the call. Charlemagne heard it, turned back, and overthrew the Saracens. The *Song of Roland,* in which this story is told, dates from the eleventh century and ranks as a masterpiece. It was translated into English, German, Italian, Norse and other languages, and formed the basis of many tales.

ROLAND DE LA PLATIÈRE, *ro lahN' deh la pla tyair',* Madame (Manon Jeanne Philipon) (1754-1793), a Frenchwoman who became very prominent during the early years of the French Revolution. She was born in Paris, and in a convent there was given the beginnings of an education. Her real education came, however, from her reading after she left school. In 1781 she was married to Jean Marie Roland de la Platière, and from the first she exercised a strong influence in his affairs. After the outbreak of the Revolution they removed from Lyons to Paris, where their home became the meeting place for many of the leaders of the popular party. In 1792 Roland became minister of the interior, and much that was excellent in the administration of his office he owed to his wife.

MADAME ROLAND

When the downfall of the Girondists came, Madame Roland continued to uphold their cause, but in June, 1793, was arrested and thrown into prison, where she spent the time in writing the *Mémoires* on which her fame rests. In November she was executed, and before laying her head on the block she bowed to the statue of liberty which had been set up near the guillotine and exclaimed, "O Liberty! what crimes are committed in thy name!" When her husband, who had escaped to Rouen, heard of her death he committed suicide.

Consult Taylor's *Life of Madame Roland;* Dobson's *Four French Women.*

ROLFE, *rolf,* JOHN, one of the first English settlers in America, celebrated in Virginia history as the first white man to raise tobacco, and later as the husband of the famous Indian princess, Pocahontas. He landed in Virginia in 1610, and when Captain Argall, the unscrupulous deputy-governor of Virginia, held Pocahontas as hostage for the purpose of extorting such terms from her father as he required, Rolfe married her in the presence of her uncle and two brothers. This event freed the colony from the enmity of Powhatan and preserved peace between the whites and Indians. A son was born of the marriage. After the death of Pocahontas in England, in 1617, Rolfe returned to the colony and took an active part in its affairs. See POCAHONTAS.

ROLL'ING MILL, a mechanical appliance for rolling iron or steel into ingots, bars, rails and plates for use by boiler makers, bridge builders, platers and for general and railroad constructional work. The mill contains a series of rollers in pairs, through which the metal is passed and rolled or pressed into the required shape. The rollers, made of steel, are mounted on frames capable of resisting enormous strain and are driven by high-power horizontal, reversible engines. According to the purpose for which the rolled metal is intended, the rollers are grooved or flat surfaced. The rollers are geared to each other by cogwheels, and each machine is fitted with devices for feeding and guiding the metal as it passes through the rollers.

The use of rollers is universally found necessary, even in the case of cast steel, which in casting acquires certain weaknesses, such as blowholes, caused by the gases generated. The rolling process does away with blowholes, and it strengthens and makes the finished product homogeneous. If plates are required, white hot steel is inserted between two rollers, revolving in opposite directions. The result is a broad, flat sheet which is rolled until the required thickness is reached. For making rods, the rollers are grooved to the required shape. Armor-plate rolling mills are specially designed for massive work; the rollers are from ten to fourteen feet long and from three to four feet in diameter.

For rolling rails, one of the most important functions of rolling mills, the rolls are grooved to produce the rails ready for use. The metal is raised to white heat and then conveyed to the rollers, through which it is passed seven times. It is thus reduced to the form of ingots or bars, about fifteen feet long and nine inches square in section, which are later *sheared* into two or three pieces according to the desired size for the finished rail. These pieces, or *blooms,* are again heated and then passed through the rail mill, consisting of three sets of rollers. The first, or *roughing,* rolls receive the blooms one after another, and roll them into approximately the form of rails. After being passed through the roughing mills five times, the rails pass five times through the *intermediate* rolls, from which they are transferred to the *finishing* rolls. A mill with three sets of rolls is known as a "three-high;" if the intermediate rollers are omitted, it is a "two-high." After they come from the finishing rolls, the rails are cut into sections of thirty or sixty feet, as desired, and are lastly put through the *camber* rolls. Cambering gives them a convexity just enough to assure straightness when they cool. From the time the cast ingot leaves the steel mill until the finished rail is ready for shipment it is not touched by human hands; it is handled only by machinery. W.F.Z.

ROMAN CATHOLIC CHURCH, that body of Christians which accepts the Pope as its head on earth and looks upon him as the representative of Christ and as the successor in direct line of Saint Peter. It believes that the special powers delegated by Christ to the chief of the Apostles have descended to the Pope, and that he is therefore in matters of religion infallible. Any decree concerning faith or morals promulgated by the Pope, or by the Pope and the bishops in council, is held to be of necessity free from error; for Roman Catholics believe that by special protection of the Holy Spirit their Church has kept unchanged the doctrines laid down by Christ, and that it is impossible for errors to creep into the official teachings of the Church.

Doctrines and Sacraments. The doctrines or beliefs of the Roman Catholic Church are set

forth in the Apostles' Creed and its variants, the Nicene Creed, the Athanasian Creed, and the Creed of Constantinople. The most minute statement of the doctrines, constituting a summary of the other creeds, is that issued by Pius IV in the sixteenth century, after the Council of Trent.

The sacraments of the Church, which are of the utmost importance because they are believed by all Roman Catholics to have been instituted directly by Christ, are seven in number. Three of them, the first, second and sixth in the list below, are administered only once to an individual, because they are believed to make so definite and lasting an impression on the soul that repetition is unnecessary.

1. *Baptism.* This is administered to infants as well as to adults. In the former case it is held to wash away the original sin and to effect the sonship of the child with God by the infusion of sanctifying grace; in the case of adults it moreover washes away all sins previously committed.

2. *Confirmation.* This confirms the graces of baptism, and is held to bestow the Holy Ghost.

3. *Holy Eucharist.* This is a sacrament which, it is held, truly and substantially contains body, blood, soul and divinity of our Lord Jesus Christ under the species of bread and wine. It is brought into existence by the consecration at Holy Mass where bread and wine are substantially changed into the living body and blood of our Lord. It continues to exist as the adorable "Blessed sacrament" as long as the appearances remain, and is thus preserved in the tabernacle of the altar. It becomes the nourishment of the faithful in Holy Communion. It was instituted by Jesus Christ at the "Last Supper" on the eve of His passion. A precept of the Church obliges every Catholic who has attained the use of reason to partake of this sacrament in Holy Communion at least once a year at Paschal time. More frequent, even daily communion is counseled by the best theologians and the authorities of the Church themselves.

4. *Penance.* This consists of three stages: sorrow for sin and a determination to amend; confession or accusation of one's self to a priest, who is vowed to eternal secrecy; and the acceptance of certain penitential acts which are imposed by the priest. The penitent being duly disposed the priest may pronounce absolution (which see).

5. *Extreme Unction.* As the other sacraments give help in the various affairs of life, so this is believed to impart grace and strength to meet without flinching the bodily and spiritual struggle of the dying hour. It is held to destroy certain effects of sin, sometimes even sin itself.

6. *Holy Orders.* By this sacrament the clergy are differentiated from the laity, and are admitted into the definite service of Christ, receiving at the same time the spiritual powers requisite for the exercise of their respective orders.

7. *Marriage.* According to the Roman Catholic Church, marriage is a sacrament instituted by Jesus Christ to sanctify the lawful union of man and woman and to give them the graces necessary for their state. This bond cannot be dissolved except by reason of some nullifying circumstances which existed when the sacrament was attempted. Separation may be granted on account of circumstances occurring after the marriage, but not dissolution.

Further Beliefs and Ceremonies. The most sacred and solemn liturgical function of the Church is the Mass, which is believed to be the commemoration, continuation and consummation of the Sacrifice of the Cross (see MASS).

An outstanding feature of the Church is its belief in purgatory, a place of purification after death. If a man dies penitent, but has not been fully cleansed from sin, he may, according to this doctrine, make atonement in purgatory for his sins, and may then be admitted to heaven.

All the saints of the Church are honored, but a special veneration is given to Mary, the mother of Christ, who can, the Roman Catholic believes, obtain for him many spiritual blessings by her intercession. Other saints, especially Joseph, the husband of Mary, may also intercede, but are not so powerful.

A Catholic has laid upon him six ecclesiastical precepts of especial force. He must:

1. Hear Mass on Sunday and holy days.
2. Receive Communion at the Easter time.
3. Observe certain fast days and days of abstinence.
4. Make confession to a priest at least once a year.
5. Contribute to the support of the Church according to his means.
6. Refrain from contracting marriage within the forbidden degrees of kindred, or privately, and from solemnizing marriage at certain times of the year.

The Priesthood. The Church believes in a body of priests who stand as mediators between God and man, performing especially the function of offering sacrifice for the living and the dead. These mediators are set aside by the bishops, who stand as the direct successors of the Apostles. Of its priesthood the Church exacts celibacy, holding that an unmarried clergy may serve God with more freedom and with undivided heart. The law requiring celibacy is for purposes of discipline only, and has nothing to do with the doctrines of the Church. Indeed, there is nothing in the doctrines which demands that the Church impose this obligation.

History. This Church is the earliest of Christian organizations, and when, after three centuries of bitter persecution, it was given free-

dom by the edict of Constantine and Licinius (Milan, 313) it acquired an immense influence. Bishoprics were established in various parts of the Empire, but the one at Rome remained supreme, and in time the title of *Pope,* or *father,* originally borne by all the bishops indiscriminately, began to be restricted to the bishop of Rome. In 1073 its use by any other bishop was formally forbidden.

During the Middle Ages the Church wielded secular as well as religious domination, and at times held considerable territories, but the civil rulers never looked with favor upon this feature of the Church's activities, and long and fierce struggles were waged with the Holy Roman emperors for supremacy. Sometimes one party, sometimes another, was in the ascendancy, and it was not until the Concordat of Worms (1122) that the spiritual and temporal powers of either claimant were strictly defined. With the establishment of the modern kingdom of Italy in the nineteenth century the Church was shorn of its secular powers (see ITALY, subtitle *History;* POPE).

Meantime, however, the Church had endured two severe blows. In the ninth century there began that schism within the body which resulted two centuries later in the formal establishment of the Greek Church; and in the sixteenth century the Protestant Reformation was the cause of another division. These movements, however, did not permanently affect the vigor of the Church, which is to-day as great as it ever was.

Statistics. The Roman Catholic Church has more members throughout the world than any other church. Its total followers are estimated at more than 272,800,000, of whom about two-thirds live in Europe. In 1915 there were in the United States about 16,309,000 Roman Catholics, while Canada, according to its 1911 census, had 2,833,041. G.W.M.

Consult Fitzgerald's *Fifty Years of Catholic Life and Progress;* Carroll's *Religious Forces in the United States.*

Related Subjects. The numerous topics in these volumes which relate to the forms or the beliefs of the Roman Catholic Church are as follows:

Abbot
Absolution
Altar
Antipope
Archbishop
Ave Maria
Benedictines
Bishop
Breviary
Bull
Canon Law
Canonization
Capuchins
Cardinal
Carthusians
Censer
Charity, Sisters of
Conclave
Concordat
Counter-Reformation
Dominicans
Eucharist
Franciscans
Hermits
Hierarchy
High Priest
Holy Water
Incense
Index Expurgatorius
Indulgence
Innocents, Feast of Holy
Jesuits
Litany
Liturgy
Magnificat
Mass
Mendicant Orders
Mercy, Sisters of
Missal
Monasticism
Monk
Nun
Nunc Dimittis
Nuncio
Paulists
Penance
Pope
Priest
Purgatory
Rogation Days
Rosary
Sacrament
Sacred College
Unction
Ursulines
Vatican Council

The list under the article RELIGION contains certain more general topics which will be of interest in this connection, and the biographies of the following churchmen, saints and religious leaders may also be consulted:

Ambrose, Saint
Anthony, Saint
Aquinas, Saint Thomas
Augustine, Saint
Augustine, Saint
Barbara, Saint
Becket, Thomas á
Begin, Louis Nazaire
Bernard, Saint
Boniface, Saint
Bridget, Saint
Bruchesi, Louis Paul
Cecilia, Saint
Chrysostom, Saint John
Corrigan, Michael Augustine
Dunstan, Saint
Falconio, Diomede
Farley, John Murphy
Francis of Assisi
George, Saint
Gibbons, James
Ignatius, Saint
Ireland, John
Jerome, Saint
Lanfranc
Langevin, The Most Reverend Louis
Loyola, Saint Ignatius of
Manning, Henry Edward
Mercier, Honoré
Merry del Val, Rafael
Mundelein, George W.
Newman, John Henry
Nicholas, Saint
O'Connell, William H.
Patrick, Saint
Ryan, Abram Joseph
Ryan, Patrick John
Satolli, Francesco
Sebastian, Saint
Spalding, John Lancaster
Tertullian
Theresa, Saint
Thomas à Kempis
Ursula, Saint
Valentine, Saint
Veronica, Saint
Walpurga
Xavier, Francisco
Ximenes, Francisco

ROMANCE, *ro mans',* a name applied to any story, whether told in verse or in prose, which lays stress upon heroic or marvelous happenings and makes little attempt at presenting realistic pictures of life. Originally the term meant any composition in one of the Romance languages, but since tales of adventure, in the early periods of the modern era, were the most popular writings in those languages, the name gradually narrowed to its present significance. These languages were by no means the first in which such narratives were written, for the ancient Greeks delighted in stories of adventure which were clearly the forerunners of the modern romance. Of these the earliest is the *Odyssey.* The *Iliad,* which strove for truth in its

pictures of scenes and characters, could not be so classed, but its companion epic with its frankly mythical adventures fills all the requirements. Later Greek romances introduced many of the themes which were common in the popular medieval and early modern stories, notably the wanderings of parted lovers and their final reunion.

During the medieval period the romances which were so popular in Europe were in verse, adapted to recital by minstrels. Great national or local heroes were usually the central figures, and around their names were woven the most marvelous tales. About Charlemagne, Roland, Alexander, Arthur, Richard the Lion-Hearted, the heroes of the Trojan War, great cycles grew up, which were passed on from one bard to another, each amending or adding to the material received as he saw fit. In the days of chivalry, love became one of the main motives for the action, though it was very often the artificial platonic love of knight for noble lady, rather than a more human sentiment.

Gradually, even before the invention of printing, prose began to take the place of poetry in the making of romance. The cycle relating to Arthur, for instance, came into England in prose form in Malory's *Morte d'Arthur.* In the cases of the Spanish Cid and the French Roland, however, verse always remained the classic form of the narrative. By gradual growth the romance led to the novel, but some of the greatest novelists have been in the main writers of romances rather than of the type more correctly called novels. Thus, Scott's works stand as the greatest of historical romances; most of Stevenson's tales are pure romances of adventure; while Hawthorne ranks among the greatest of romance writers. A.MC C.

ROMANCE LANGUAGES, those languages of the world which have a common origin in Latin, such as French, Italian, Spanish and Portuguese.

Whenever Rome conquered a country it sent colonists to "Romanize" the province, and these colonists, of course, took their language with them. This was not the literary Latin used in the classics studied in the schools to-day, but what is called *vulgar Latin,* meaning simply the everyday speech of ordinary people, like soldiers, tradesmen and farmers. This language was not only modified by the original language of the conquered country, but it was also subjected to the changes every language undergoes when used by uneducated speakers. Thus, the Romance languages, though springing from the same Roman tongue, are distinct from one another; each is a characteristic product of the country in which it developed.

In addition to those already mentioned, the Romance group includes Provençal, or Early French, which was the language of the troubadours who sang their ballads and romances during the Middle Ages; modern Rumanian and Romansh, the latter a general name for the dialects in certain parts of Switzerland and the Tyrol, and in the region north of the Adriatic Sea.

Consult Grandgent's *Introduction to Vulgar Latin.*

Related Subjects. The reader is referred to the following articles in these volumes:

French Language
Italian Language
Latin
Provençal Language and Literature
Troubadour

RO'MAN NUMERALS, *nu'mer alz,* the number symbols of the Latin language, used to-day for numbering clock faces, for marking books, particularly the pages of long prefaces, the chapters and the volumes of a series; for inscriptions on monuments and public buildings, and for numerous less important uses. But for all calculations in mathematics and in science, in business and in everyday life, the Arabic system has been used since the twelfth century (see ARABIC NUMERALS).

The Roman system of counting, like most others, is by tens. This is because the counting of all primitive people was done on the fingers. In the beginning it was not a letter system, although it is now written with the capital letters of the Latin alphabet. Most of the earlier symbols were derived from the Etruscans, a people that lived in the north of Italy many hundreds of years before the time of Christ. The symbol *I* was not the capital *I,* but was simply the most obvious mark for *one,* a vertical stroke. The symbols for two, three and four, *II, III* and *IIII,* are equally obvious. The origin of *X* (ten) was probably a crossed *I*. *C* (100) and *M* (1,000) stand for *centum* and *mille,* the Latin words for *one hundred* and *one thousand,* but in the beginning they, too, were expressed by Etruscan symbols which scarcely resembled the letters now used. These symbols may sometimes be found in the earliest printed books. The other signs are *V* (five), *L* (fifty) and *D* (500). There is no zero. All other numbers are made from combinations of the seven symbols given.

Numbers are written from left to right, and are made thus: an *M* is put down for every

separate thousand; then five hundred is taken and *D* is written for it; next, as many hundreds are taken as possible, and a *C* is written for each; fifty is then taken and *L* is written for it; as many tens as possible are next taken and *X* is written for each; five is then taken and *V* is written for it; and finally *I* is put down as many times as there are units left over. The number 2,500 is written *MMD* (one thousand plus one thousand plus five hundred); 3,550 is written *MMMDL*.

These numbers are not particularly long or tedious to write, but in order to express 3,768, which in the Arabic notation is just as brief as 3,550, this formidable row of letters must be put down: *MMMDCCLXVIII*. Quite recently subtraction by changing the position of the symbols has come into use. Instead of writing *IIII*, the *I* is placed before *V*, and we have *IV*, which expresses one subtracted from five. Nine is written *IX* instead of *VIIII;* forty is written *XL* (fifty minus ten). The year nineteen hundred used to be written *MDCCCC*, but it is now written simply *MCM*. A.C.

ROMANOFF, *ro'man awf,* more properly Romanoff-Holstein, the name of the family that ruled Russia from 1613 to 1917. At the beginning of 1613 the country, more than half barbarous, was leaderless; the nobles chose Michael Feodorovitch Romanoff, of the royal house of Rurik, to rule them, and called him *czar*. Nineteen Romanoffs in succession controlled the destinies of the country; in reality a twentieth was ruler for a few hours, but his tenure cannot well be included. Two great names are in the list, but most of the line were merciless autocrats. Because of their severity the term *czar* has become a word of reproach.

Peter the Great was the mightiest of the Romanoffs; he found Russia floundering and almost wholly unorganized, and he left it a strong nation. Catharine the Great, profane, immoral, witty, but a great constructive leader, made her country respected in the courts of the world. For the most part the other rulers kept the light out of Russia; they filled the country with subordinate officials who worked their masters' will; they hunted down all independent men with their remorseless secret service; they governed the land with hordes of wild, savage Cossacks; they brandished the knout instead of offering the ballot. They rode ahead, defying liberty and progress, and in themselves embodied the executive, legislative and judicial functions of government. Not until the twentieth century was a legislative body tolerated; at first it was not permitted to exercise power, but gradually it forced its due privileges from an unwilling monarch, and eventually overthrew that autocrat and itself became the temporary Russian government.

Nicholas II, fairly well meaning but weak, was the last representative of his line. When his abdication was forced March 15, 1917, he named his brother Michael his successor. The latter declared that unless it was Russia's will he would not ascend the throne. His abdication followed.

The first Romanoff was Michael, and he ruled thirty-two years; the last was Michael, czar for eighteen hours. E.D.F.

Consult Edwards' *The Romanoffs: Czars of Moscow and Emperors of Russia.*

Related Subjects. The following articles in these volumes should be read in connection with this subject:

Alexander	Nicholas
Catharine	Peter the Great
Czar	Russia (History)

ROMANS, *ro'manz,* Epistle to the, the most important of all the letters written by Paul the Apostle. In this he states fully his doctrinal beliefs. The epistle was written from Corinth in the winter of 57, while he was on his third missionary journey. The theme of the whole letter, which forms a book in the New Testament, is found in this verse: "The gospel is the power of God unto salvation to every one that believeth" (*Romans* I, 16). Thus he sets forth the doctrine of justification by faith, which Luther adopted as the basis of his system (see Luther, Martin; Reformation, The).

ROMANTICISM, *ro man' ti siz'm,* the name given in literature to the movement which marked a change from a rigid adherence to classic standards to an appreciation of imagination, sentiment and the beauties of nature. No sharp line can be drawn between the romantic period and the classic which preceded it; no one country or poet can be given as the originator of the movement, but the change, though gradual, was very pronounced. No period in English history was ever more completely dominated by classic ideals than the so-called Augustan Age of Queen Anne. In poetry, particularly, form was placed before matter, and Pope was held my many to be the greatest of English poets because of the uniform correctness of his verse. Didactic and argumentative topics, which many present-day critics declare have no part at all in real poetry, were almost the only themes. See Classics.

In 1727-30 James Thomson published his *Seasons,* in which for the first time the note of interest in nature reappeared. Gray's *Elegy Written in a Country Churchyard,* Goldsmith's *Deserted Village* and Cowper's *Task* repeated and strengthened the note, and Percy's *Reliques of Ancient English Poetry,* published in 1765, reawakened that interest in the past which was one of the characteristic features of the romantic movement. Milton and Spenser, who had been looked upon as inferior to Pope, came into their own again, and their verse forms, instead of the mechanical couplet form of Pope, were imitated. The romantic movement in England reached its height in Scott, Byron, Wordsworth, Shelley and Keats, while in prose Stevenson was perhaps the greatest writer after Scott who emphasized the romantic side.

In other countries the romantic spirit gained ground just as it had done in England. The German authors Lessing, Herder, Goethe, and the group composed of the Schlegel brothers, Novalis, Tieck and others, stood at the head of the movement in their country, while in France Rousseau, Chateaubriand and Victor Hugo had most to do with the passing of the old classicism.

Consult Phelps' *Beginnings of the English Romantic Movement;* Herford's *Age of Wordsworth.*

ROMAN WALLS, the lines of defensive walls erected by the Romans to protect the northern boundary of Britain from the inroads of the warlike Picts and Scots. Remains of these walls are still to be seen, and they bear striking witness to the permanent character of the work undertaken in ancient days. The first defensive walls were erected by Agricola, about A. D. 80. Of this wall a few traces remain.

The fortifications running from the River Tyne to the Solway, completely across the northwest part of England, built by Hadrian in A. D. 120 and strengthened later by Severus, extended over eighty miles in length. Parts of

HADRIAN'S WALL

The average height at the time of building was the height of three men, one upon the shoulders of another. This wall has crumbled, but in Northumberland are to be found portions which are still twelve feet high.

the actual wall still remain. In places are still to be seen the stone drinking troughs, the guardhouses and much of the stonework of the huge gateways, with the center stones worn away where the gates once met in closing.

The Wall of Antoninus, built in A. D. 139 between the rivers Forth and Clyde, marks the northern boundary of the Roman Empire. The Romans could press no further against the valiant Picts and Scots, who waged incessant warfare and were never conquered.

ROME, the "Eternal City," for many reasons the most interesting of the world's cities. Thousands of years ago, when the ancestors of the English and Americans were living as barbarians in the trackless forests of Northern and Western Europe, it was a great city, and the center of a greater empire; it was the mighty mistress—

"That sate on her seven hills, and from her throne
Of beauty ruled the world."

Though it has had its periods of depression, it stands to-day as one of the greatest cities of romance and power and as the center of the Roman Catholic Church, the holy city toward which the eyes and thoughts of millions are directed. It thus differs from those ancient cities whose only interest is in the past.

It is the capital city of Italy, located near the western coast of the country, about fourteen miles from the mouth of the Tiber, the only navigable river of the peninsula. It bore in olden times the name of the "City of the Seven Hills," for it was built upon a group of hills or ridges which rise out of the plain.

Only from a study of its history can come a comprehension of the wonderful place which Rome has filled in the life of the world.

The Ancient Mistress of the World

The Mediterranean Sea was the center of the ancient world. Slowly civilization spread about its shores from east to west, from Egypt and Western Asia to Greece, and, finally, to Rome; and each nation, as it rose, developed and eventually disappeared, contributed something to the growing civilization. Rome stood as an example of law and government—for the ability to organize an empire and to rule it; and it also preserved and handed down the treasures of science and of art which it had received from the older nations. Says a modern historian, "The Roman Empire is the lake in which all the streams of ancient history lose themselves and which all streams of modern history flow out of." The history of Rome is ancient history, but without a study of it modern history cannot be understood.

The Period of Legend. The Romans were very proud of their origin, for were they not descended from that great hero of Troy, Aeneas? Wandering about after the fall of the city, legend says, he was led by the gods to Italy, and there his son founded Alba Longa (the Long White City), which became the chief of the Latin cities. Centuries later, Romulus founded on the Palatine, one of the seven hills, a new city which was called Rome. This, according to the commonly accepted tradition, was in 753 B. C., and all through later times Romans dated all events *ab urbe condita,* "from the founding of the city." Other settlements were made on the neighboring hills, and in time these all merged into one city, which had its assembly place and market place, or *forum,* in the hollow between two of the hills, and its citadel on the Capitoline hill (see map for location of the seven hills). Tradition says that in these early days Rome was a kingdom, and the names of the kings are given, with many of the events of their reigns—Romulus, Numa Pompilius, Tullus Hostilius, Ancus Martius, Lucius Tarquinius, Servius Tullius and Tarquinius Superbus. The last-named of these was so tyrannical that the people rose against him in 509 B. C. and expelled him, vowing that never again should one man hold lifelong power in Rome. A republic was therefore declared, and the very name of king became hateful.

Classes in Early Rome. All these stories of the years of the kingdom are purely legend, many of them consciously invented by writers in succeeding centuries just to glorify Rome, but certain things about the organization of society are definitely known. The descendants of the earliest settlers reserved for themselves the rights of citizenship—they were the *patricians,* or "men with fathers." Later on, as Rome extended its sway beyond the walls and as inhabitants from the conquered towns of Latium moved into the city, another class was formed which had no political rights. These "common people" were known as the *plebeians;* and much of the early history of Rome is taken up with their struggles with the patricians. They resented the fact that they could have no part in the *comitia curiata,* that earliest popular assembly, though they did not venture thus early to hope for membership in the Senate, which was composed of the chiefs of the three hundred clans. Even before the close of the hazy, almost mythical royal period, the plebeians had gained some rights; true, these were dependent on property qualifications, but even that was a distinct advance toward democracy.

Early Days of the Republic. The chief officers in the new republic were two consuls, who were chosen for one year and had joint sway. In effect, they were kings, possessing wide powers, which were limited only by the shortness of their term. Rome was not a republic in the sense that it had "a government of the people and by the people;" the plebeians, indeed, were in a less favorable position than under the later kings. But the strife went on, and by 494 B. C. the lower order had gained one

concession—the creation of two *tribunes of the people,* who had as their special office the protection of the rights of the plebeians. The latter party also succeeded in having their assembly of tribes, always an unrecognized body, given legal standing and certain definite powers, for they had hit upon a very effective method. They simply threatened to secede from Rome and build a city of their own; and the patricians, because they could not do without the working classes, grudgingly gave in to their demands.

Written Laws. Hitherto the laws had never been written, and of course they could be more or less distorted by anyone in power. Now the plebeians demanded a regular code, so that every one might know what really was the law, and though the patricians fought hard they were finally compelled to submit to the appointment of *decemvirs* and the drawing up of the Laws of the Twelve Tables. These served as the basis of all later Roman law. Connected with this period of the decemvirs is the story, variously told but always interesting, of Virginia, whose father killed her rather than to see her led away to slavery and shame. Macaulay's poem *Virginius* tells the story.

Other Plebeian Gains. Not content with their growing political power, the plebeians demanded social equality, and in 467 B.C. compelled the Senate to agree to a law permitting marriage between the two classes. There was still one sharp grievance, however—the sacred office of consul remained open only to patricians. The Senate agreed to the election of military tribunes with consular powers, who might belong to either order, but even this was not satisfactory, and the struggle continued. In 367 B.C. the Senate was forced to agree to the Licinian Law, which declared that one consul each year must be a plebeian; and the great victory had been won.

External Expansion. Outwardly this period had not been one of peace. The Etruscan towns, subdued during the time of the kings, revolted after the kings had been driven out, and Rome had to fight for its very life. Volscians, Etruscans and Aequians led their armies against the city, but in the end Rome conquered and became again the head of the league of Latin cities. But in 390 B.C. there came a stronger enemy, the Gauls from the north. They sacked the city, destroying everything valuable in their seven months' stay, but

failing to take the citadel, which was heroically defended by Manlius. After 367 B. C., when the class struggle finally closed, expansion was rapid. It was not, however, unresisted. The Latins revolted for the last time in 338 B. C., but were crushed and made subject to Rome; and in 326 began a struggle with the Samnites, rude and aggressive mountain tribes, which did not terminate for almost fifty years, but which left Rome dominant in the peninsula. One more struggle, with Pyrrhus, king of Epirus, and all the peoples of Italy acknowledged the supremacy of the city on the Tiber.

"Carthage Must be Destroyed." But outside of Italy was an enemy not so easily subdued—Carthage, on the North African coast, the greatest sea power in the world. Though originally the two cities had been allies, an inevitable jealousy had grown up between them which in 263 B. C. resulted in open war. Three terrific combats known as the Punic Wars were fought before Rome gained that final victory which had been made possible only by the creation of a navy and the breaking of Carthaginian power on the sea. True, the close of the First Punic War in 241 B. C. saw Carthage exhausted and ready to make almost any terms, but Rome realized, as the statesman Cato declared in every speech, that "Carthage must be destroyed," and consequently prepared for further war. In the Second Punic War (218-202 B. C.) the outstanding figure was Hannibal, the Carthaginian general, whose crossing of the Alps was one of the dramatic events of history. The disasters which the Romans suffered at his hands were avenged when Scipio won his decisive victory at Zama, and Carthage gave up to Rome all of its colonial possessions, its navy and its elephants and promised never again to make war without the consent of Rome.

Philip V of Macedon, in the old Greek state, had aided Hannibal, and to punish him Rome sent armies to the East. In three wars, the last one ending in the complete defeat of the Greeks at Corinth in 146 B. C., the Macedonian empire was broken up and Greece was made a Roman province. In the same year also ended the Third Punic War, which consisted merely of the three-year siege of Carthage. The defense was heroic but vain, for the splendid city was destroyed and the Carthaginian empire was ended. Meanwhile Spain, received from Carthage, had proved very unsubmissive, and only by the constant presence of a large army could it be kept in subjection.

Last Century of the Republic. During this period the two streams continued to flow side by side—of class dissension within, of conquest without. A change had begun to show itself in the national character—a departure from the simplicity and severity of the early life and an ever-increasing luxuriousness and immorality. Occasional reformers arose, but never was the tide successfully stemmed, and through all the years when Rome was most glorious in the eyes of the world its people were slowly disintegrating, slowly preparing for that decline which later came with such apparent rapidity. Sincere and steadfast belief in the old gods was dying out, and to take its place there was only skepticism among the upper classes and superstition among the lower.

Internal Affairs. Nominally, both orders of Roman citizens had the same civil and political rights; in reality, however, power was in the hands of the wealthy nobles, who governed entirely in their own interests. Champions of the plebeians were not wanting who fought desperately to better their condition, but little of permanence was accomplished. The land system continued as unjust, the officials as untrustworthy. Nor were the plebeians within the city the only ones who struggled for their rights. The subject Italian peoples, demanding the rights of citizenship which had been limited to the inhabitants of Rome, precipitated in 91 B. C. the so-called Social War, in which the military genius of Marius, Sulla and Pompey made Rome victorious. But, wisely enough, the subject peoples were given what they demanded, and henceforth had the franchise. Three years later the jealousy of Marius and Sulla led to that bloodthirsty conflict known as the Civil War, in which the two parties, the lower class under Marius and the patricians under Sulla, proved equally violent. No man was safe from massacre, and not until 82 B. C. was the struggle ended by the triumph of Sulla. In 63 B. C. another danger threatened the city—the conspiracy of Catiline—which was foiled only by the watchfulness and genius of Cicero.

External Conquests. During this time more than one war was brought to a successful conclusion. Jugurtha, who had seemed invincible, was conquered by Marius, and the terrible menacing hordes of the Cimbri and Teutons were turned back by the same hero, at a time when it had seemed that Rome was surely doomed. Another famous conflict of these years was the war with Mithridates of Pontus. It was the appointment of Sulla to the com-

mand of this war which had so inflamed the jealousy of Marius, but it was Pompey who brought the struggle to a successful conclusion. But the most important of all in their after effects were the campaigns of Caesar in Gaul, which made him so popular and so powerful that Rome lay at his feet.

The name of Pompey suggests a list of names of men who for a period held the fate of Rome in their hands; for the Senate, so long almost absolute, had lost by degrees its power, and the day of the individual had come in Roman history—of the individual who was strong enough and unscrupulous enough to seize the power and wield it for his own good. Pompey, Caesar, Crassus, Cicero, Lepidus, Mark Antony, Augustus—the lives of these men made up the history of Rome in this concluding period of the republic. Civil war followed the death of Caesar, and from it one man, Octavius, emerged supreme.

THE ANCIENT AND THE MODERN CITY

At the left the location of the seven hills is shown: they are (1) Quirinal, (2) Capitoline, (3) Viminal, (4) Esquiline, (5) Palatine, (6) Aventine, (7) Caelian. The second and third maps compare the areas of the ancient city and present-day Rome.

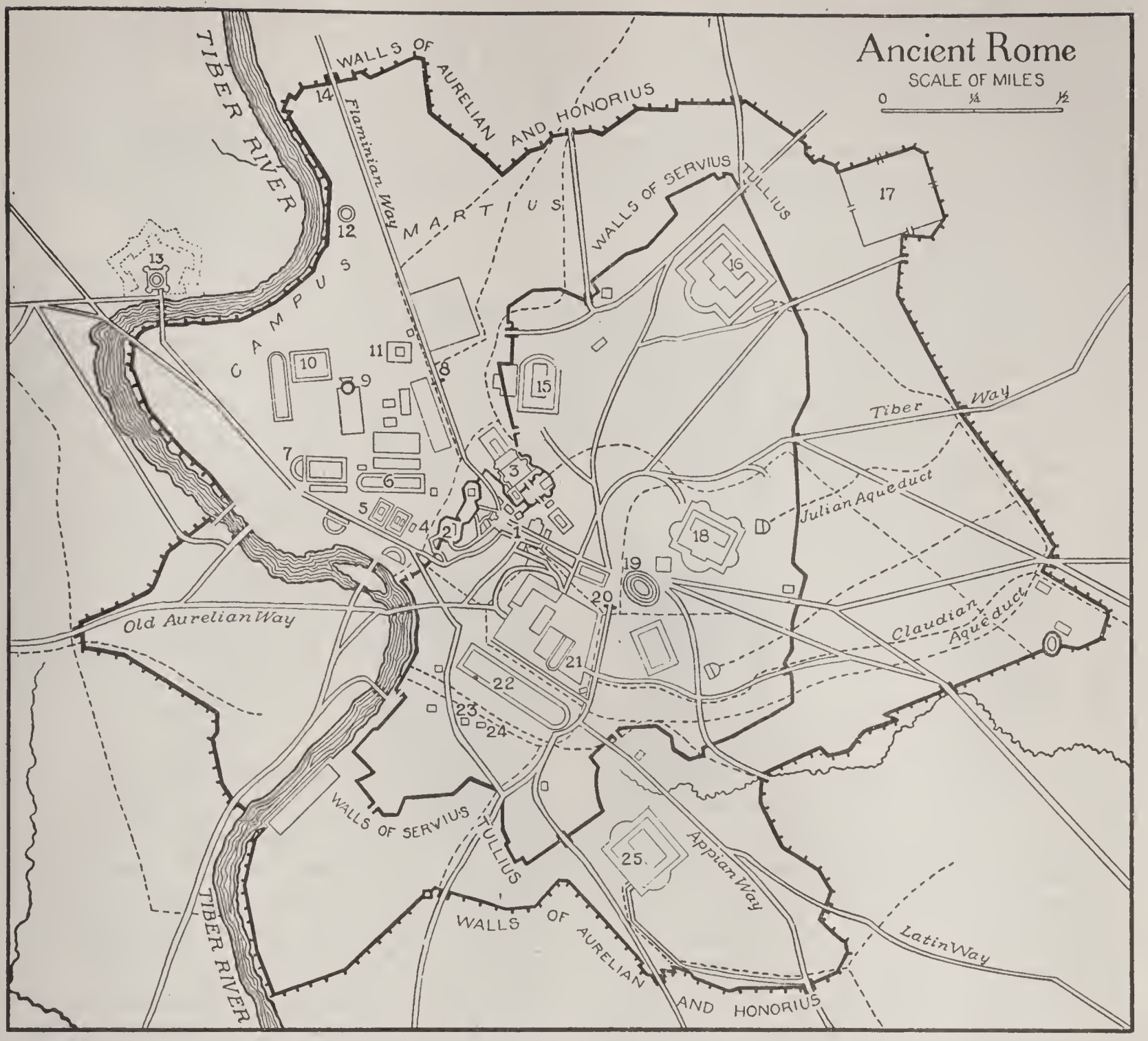
The Growing Empire. Having rid himself of all rivals and accepted from the hands of a compliant Senate all the highest offices, Octavius, or Augustus, as he was henceforward called, established what was in effect an empire, though the name and some of the forms of the republic were still preserved. During his time the glory of Rome was at its height, and though none of his successors equaled him in ability, the power was so firmly grounded that it endured and even apparently increased for almost two centuries. To be a Roman citizen was one of the greatest honors the world afforded, for back of every citizen stood the vast power of the Empire. The book of *Acts,* in describing the persecution of Paul in Jerusalem, has the following significant passage:

> And when they had tied him up with the thongs, Paul said unto the centurion that stood by, "Is it lawful for you to scourge a man that is a Roman, and uncondemned?"
>
> And when the centurion heard it he went to the chief captain and told him, saying, "What art thou about to do? For this man is a Roman." And the chief captain came and said unto him, "Tell me, art thou a Roman?" And he said "Yea." And the chief captain answered, "With a great sum obtained I this citizenship." And Paul said, "But I am a Roman born."
>
> They then that were about to examine him straightway departed from him; and the chief captain also was afraid when he knew that he was a Roman, and because he had bound him.

Occasionally during the first two centuries a tyrant arose, as Tiberius or Nero, who set aside the forms of constitutional government and was frankly despotic. In the main it was only the city of Rome which suffered at the hands of such men, the provinces being efficiently governed; but in the later years even the forms of constitutionality were ignored.

Tiberius, the successor of Augustus, was able but unscrupulous, and it was he who instituted the system of spying which so many of the later emperors employed. During his reign occurred the Crucifixion of Jesus of Nazareth. His successors were the mad Caligula (37-41), with his insane follies; Claudius (41-54), during whose reign Southern Britain was subdued; and Nero (54-68), whose name is a synonym for cruelty and viciousness. During his reign the burning of Rome took place, and the persecution of the Christians, who were accused of having set fire to the city.

A listing of the emperors is not necessary. Many of them were mediocre men, who obtained their power by bribing the army; but now and then one stands out by reason of especial ability or goodness. Thus there were Vespasian and Titus, father and son, whose reigns were noteworthy for their freedom from tyr-



IMPORTANT FEATURES OF THE ANCIENT CITY

1. Forum
2. Capitol
3. Forum of Trajan
4. Temple of Apollo
5. Temple of Jupiter
6. Circus Flaminius
7. Theater of Pompey
8. Arch of Diocletian
9. Pantheon
10. Baths of Nero
11. Temple of Neptune
12. Tomb of Augustus
13. Tomb of Hadrian
14. Flaminian Gate
15. Baths of Constantine
16. Baths of Diocletian
17. Camp of Praetorian Guard
18. Baths of Trajan
19. Flavian Amphitheater (Colosseum)
20. Arch of Constantine
21. Hippodrome
22. Circus Maximus
23. Temple of Minerva
24. Temple of Diana
25. Baths of Caracalla

anny; and there were the "five good emperors," Nerva, Trajan, Hadrian, Antoninus Pius and Marcus Aurelius, whose reigns extended from 96 to 180. It was during the reign of Trajan that the Roman Empire reached its very greatest extent, for Hadrian, realizing that far-distant frontiers were but a danger to the Empire, abandoned the territories beyond the Euphrates in Asia.

The Decline of the Empire. This began with Commodus (180-192), the infamous son of the illustrious Marcus Aurelius, and proceeded slowly at first, but later with frightful rapidity. The army became the dominant force and for almost a hundred years (193-284) placed upon the throne one after another of the "barrack emperors," so called because they were placed in power by the army. The first of them, Septimius Severus (193-211), was the ablest, and, if he governed with a firm hand, like a soldier, he at least kept the Empire intact. A second persecution of the rapidly-spreading sect of Christians took place under him, but later he took the new religion under his protection. A temporary respite came with the reign of Alexander Severus, who was a just man, but after his time came chaos and almost anarchy. Within the city there were warring claimants to the throne; on the borders savage hordes were pressing farther and farther in. From 268 to 284 there was a succession of emperors who showed some ability, and for a time the tide

was stemmed, but their reigns were short and they accomplished nothing permanent.

Diocletian (284-305), under whom occurred the last frightful persecution of the Christians, perceived that one man could not administer so great an empire, and divided the state into East and West empires, making Maximian joint emperor, and from that time on there are two parallel streams of Roman history. The dissolution had begun; but under the great Constantine, who was sole ruler from 323 to 337, the state was again united. He made Christianity the state religion, and moved the center of government from Rome to a newly-founded city on the Bosporus, which he called Constantinople. After Constantine's death came another period of wild disorder, during which the only living, growing thing in the Empire seemed to be the Church. Julian (361-363), called *the Apostate,* tried to restore paganism, but the Church had become too strong to be overthrown.

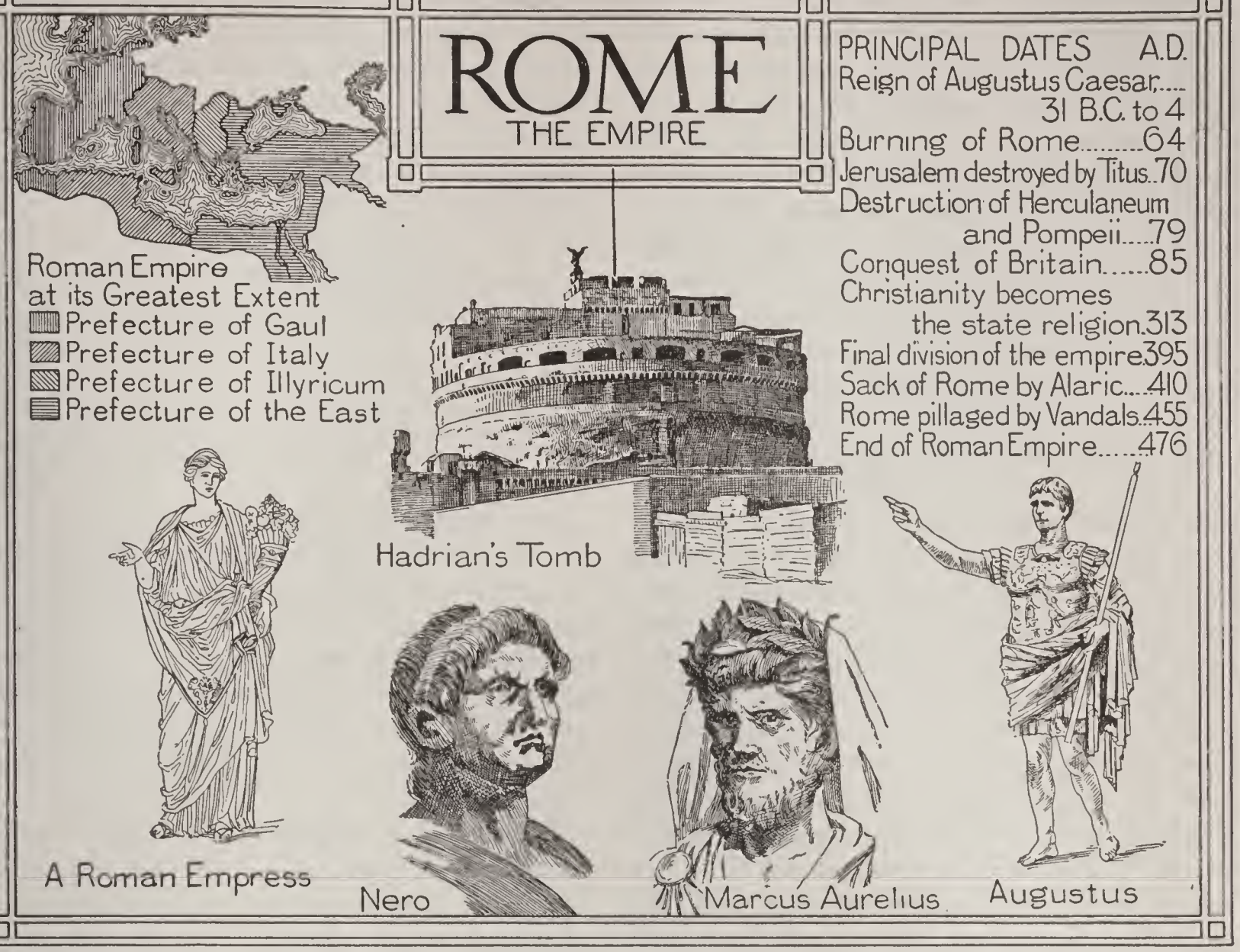
The Fall. Occasionally an emperor or a general arose who was strong enough to beat back the barbarians—Huns, Goths, Franks, Alemanni or Visigoths—who were threatening the frontiers, but it became clear that the end of Rome's power was approaching. Theodosius the Great (379-395) might in a more favorable time have proved one of the strongest of the emperors, but even his efforts were in vain. In 410, when the genius of the famous general Stilicho was no longer opposed to them, the Goths under the ruthless Alaric ravaged the peninsula of Italy, and for three days pillaged Rome. The legions had to be withdrawn from the provinces to protect the city, and everywhere the barbarians pressed in. The Visigoths took Spain and Southern France, the Vandals possessed themselves of Northern Africa, and the Huns laid waste the Eastern districts. In 451 the Huns under Attila were turned back from Rome only by the pleas of Leo the Great, bishop of Rome. Four years later the Vandals sacked the city, and then for a period the Suevic Ricimer was supreme in the city, though there was still a nominal emperor.

The powerless ruler in 476 was a boy who bore, strangely enough, the name of Romulus, founder of the city. Perceiving his weakness, Odoacer placed himself at the head of all the hired troops in the city and dethroned Romulus, and took the title of king of Italy. Thus the Roman Empire was brought to an end, though in the time of Charlemagne the name came into vogue again in connection with that strange creation, the Holy Roman Empire (which see). For the Eastern Roman Empire, see Byzantine Empire.

How the City Looked. The city which was the center of this vast Empire naturally bore in its long history many aspects, but the best-known one is that which it presented in the days of Augustus. He "found a city of wood and left one of marble," it was said, but most of the streets were narrow and crooked, and some of them were very dirty and squalid. Some parts, however, with their white marble buildings, their porticoes and triumphal arches, were marvelously beautiful. Just what the limits of the city were in those days cannot be known, but it was doubtless somewhat larger than the later walled city; for it was not until the days of Aurelian (270-275) that a line of fortifications was built about the city. Nor is it possible to determine just the population of the city. Some authorities declare that in the days of the early Empire it was 2,000,000, but this is regarded by most scholars as an extravagant estimate.

The centers of the city's life were the *fora* (plural of *forum*), or open places for public meetings, and one of these was so much more important than the others that it was called *the* Roman Forum. Far more splendid, however, was the forum of Trajan, about which were grouped some of the most beautiful buildings of the city. Here stands to this day the great Column of Trajan with its sculptures which have revealed to modern scholars much about the customs and methods of fighting, as well as about the history of Trajan's day.

The Romans were famous for their engineering works, and most of all, perhaps, for their roads. Within the city the chief street was the *Via Sacra,* or Sacred Way, which ran from the Forum to the summit of the Capitoline Hill, where stood the oldest and most sacred temple in the city—that of Jupiter Capitolinus. Along this road, whose lava-block pavement is still in fairly good condition, passed the famous triumphal processions of the emperors and generals, as they returned from victorious wars. Without were those world-famous roads, the Appian Way and the Flaminian Way. Then there were wonderful sewers, of which the most famous, the *Cloaca Maxima,* is still in use, though it was built in the time of the kings; and the aqueducts through which water was brought to the city from the far-away Apennines. Some of these still carry the city's water supply. See Aqueduct.



Buildings. To list all of the important buildings in an article of this length is impossible; some few, however, must be noticed. There were temples everywhere—no fewer than three hundred of them, it is said; and the sites of many of these are known. Most famous of all was the Pantheon, a temple to all the gods, as the name indicates. This great, circular-domed building is to-day the most perfectly preserved of all the ancient Romans' structures. Some of the old temples have been turned, in part at least, into churches and so have been preserved.

There were numerous public baths, which formed one of the most characteristic features of the imperial city, and the ruins of some of these great buildings, with their sumptuous decorations, prove the love for luxury which was an inherent part of Roman character in imperial days. Of amphitheaters, in which the city abounded, the oldest was the *Circus Maximus,* built in the days of the kings, but the most famous was that known as the Colosseum, which constitutes the most imposing ruin of Rome. Many of these theaters were built on the *Campus Martius,* the great plain within the curve of the Tiber, which was given up largely to sport and to military exercises. Another characteristic feature of the city was the triumphal arches, those soaring structures which the emperors built to commemorate their victories.

One of the illustrations accompanying this article gives an idea of the city and of its best-known landmarks in the days of its great prosperity.

The Modern City of Rome

It is impossible to consider the "Eternal City" simply as the capital of a modern nation apart from its historic associations, for there are evidences of the latter on every hand.

General Description. Rome to-day is about fifteen miles in circumference. About it stretches a wall which is in large part that built by the Emperor Aurelian, and within this the Tiber divides the city into two unequal parts. On the right bank are those great centers of Catholic Christendom, the Vatican and Saint Peter's, and a populous section has sprung up around them; but the larger part of the city is on the other side of the Tiber, on the old Campus

Martius. Ten fine bridges, three of them ancient in part, cross the river within the city walls, and the treacherous stream has been confined within stone embankments, that it may not overflow as in former times. All in all, though it still has its "slums," Rome is an attractive city, and since the introduction of modern improvements it is healthful, despite its situation on the fever-breathing *Campagna,* the plain surrounding Rome, made malarial by the overflow of the Tiber and the resulting marshes. This area has lately been drained and made more healthful.

The Seven Hills. The Palatine Hill, where was planted the very earliest settlement, is now in part a public park, in part a mass of ruins among which excavations are still being made. Here stood in olden times most of the palaces of the wealthy Romans, and modern research is revealing remains of great splendor. On the Aventine and Caelian hills, too, are ruins, and little else, for few modern habitations have been built there, while on the Esquiline and Viminal have sprung up crowded industrial quarters. The Quirinal, near the center of the modern city, is crowned by the royal palace and the chief public buildings, while the Capitoline Hill, as in ancient days, is a most impressive spot. Here stands the Capitol, designed by Michelangelo to take the place of the ancient structure, and here are famous modern museums of art and the great monument erected to Victor Emmanuel.

Other hills there are which were not numbered with the original seven—the Pincio, which with its beautiful gardens and walks constitutes a favorite afternoon resort, and the Janiculum, on the other side of the Tiber. This was the old lookout spot, the outpost of the city.

> For since Janiculum is lost,
> What hope to save the town?

says Macaulay. To-day it is laid out in public drives and walks.

Buildings and Institutions. Rome has its full share of churches, among which may be mentioned the great Saint Peter's and the Lateran; and of palaces, of which the Barberini, Colonna, Farnese, Orsini and the Borghese (outside the city) are the most famous. This latter contains a celebrated collection of pictures, by no means the only one in the city, for Rome is rich in museums, whether of paintings, of sculpture or of antiquities. The greatest is that of the Vatican, but the Capitoline Museum also contains some of the world's chief art treasures.

Among the schools of Rome the university is the oldest and most famous, but it has no longer the importance which it possessed four centuries ago. There are several seminaries for the training of priests and of diplomats, various academies of arts and sciences and schools for classic study founded by almost all the leading nations. Best known of these to Americans is the American School of Classic Languages. For a long time Rome was the center of art study; this position it no longer holds, for it has been surpassed by Paris.

Industrial Life. The Campagna about Rome has been, until recently, mainly an untilled waste, and most of the provisions of the city were brought from a distance. This is yet true, to a great degree. Its chief commerce is in cattle, grains and wine. In return it sends out its limited manufactures, mostly such art objects as mosaics, terra cotta, copies of well-known paintings and statuettes, though artificial flowers and imitation pearls are made in considerable quantities. But industrially Rome is of minor importance.

History. For centuries after the fall of the Empire Rome was but a dependency of the Byzantine Empire, and had no history but that of the Church. Latterly its life has been merged in that of Italy, for with the stirrings of the desire for Italian unity came a renewed feeling for Rome as a secular as well as a Church capital. In 1848 Pope Pius IX was driven from the city and a republic was formed, but in the next year French troops recaptured the city, and under their protection the Pope reigned until 1870, when Italian troops possessed it. In the following year the famous city, with all its heritage of glory and of disaster, became the capital of United Italy. The king took up his residence in the Quirinal, and the Pope became, according to his own description, a "prisoner in the Vatican."

The population of Rome, according to the census of 1915, was 590,960. A.MC C.

Consult Ferrero's *Greatness and Decline of Rome* (translation by Zimmern and Chaytor); Baddeley's *Rome and Its Story;* Myers' *History of Rome;* Abbott's *The Common People of Ancient Rome.*

Related Subjects. The following articles in these volumes will be of interest in connection with this study of Rome:

HISTORICAL ARTICLES

Agrarian Laws	Caesar
Appian Way	Campus Martius
Atrium	Censors
Augurs	Cimbri
Byzantine Empire	Circus

Colosseum
Comitia
Consul, subhead *The Roman Consul*
Decemvirs
Equestrian Order
Fabius
Fasces
Flamen
Forum
Gladiators
Goths
Helvetii
Huns
Italy, subtitle *History*
Legion
Lictors
Lupercalia
Pantheon
Patrician
Plebeians
Pontifex
Praetor
Praetorian Guard
Punic Wars
Quaestor
Quirinal
Quirinus
Quirites
Sabines
Samnites
Saturnalia
Tarpeian Rock
Toga
Tribune
Triumph
Triumvirate
Twelve Tables, Law of the

BIOGRAPHIES

Agricola, Gnaeus Julius
Alexander Severus
Antony, Mark
Augustus
Aurelian, Lucius Domitius
Aurelius, Marcus
Brutus, Marcus Junius
Caesar, Caius Julius
Caligula
Catiline
Cato
Cicero, Marcus Tullius
Cincinnatus, Lucius Quinctius
Claudius
Cleopatra
Constantine
Crassus, Marcus Licinius
Diocletian
Domitian
Galba, Servius Sulpicius
Gracchus
Hadrian
Hamilcar Barca
Hannibal
Jugurtha
Julian
Justinian I
Lepidus, Marcus Aemilius
Lucretia
Marius, Caius
Mithridates
Nero
Nerva
Numa Pompilius
Odoacer
Otho, Marcus Salvius
Pompey
Pyrrhus
Regulus, Marcus Atilius
Romulus
Scipio
Seneca, Lucius Annaeus
Servius Tullius
Severus, Lucius Septimius
Sulla, Lucius Cornelius
Tarquinius, Lucius
Theodoric
Theodosius
Tiberius
Titus
Trajan
Valens
Valentinian I and III
Vespasian

ROME, GA., the county seat of Floyd County, is situated in the northwestern part of the state, at the point where the Etowah and Oostanaula rivers unite to form the Coosa. Atlanta, the state capital, is seventy-two miles southeast. The Central of Georgia, the Nashville, Chattanooga & Saint Louis, the Rome & Northern, the Western & Atlantic and the Southern railways provide railroad transportation, and an electric line connects with adjacent towns south. Rome was chartered as a city in 1847, and in 1915 it adopted the commission plan of government. In 1910 the population was 12,099; in 1920 it was 13,252 (Federal census). The city has an area of five square miles.

Rome is the commercial center for one of the most productive regions of the state, the river valleys yielding large quantities of cotton, grain and hay, and the more elevated lands producing a great variety of fruits and vegetables. This district is also rich in iron, limestone, coal and fire clay. Cotton mills, cottonseed-oil factories, hosiery mills, tanneries, fertilizer and furniture factories, foundries are among the 64 factories, capitalized at $5,351,000. The notable buildings are the post office, city hall, county courthouse and Carnegie Library. Eight bridges span the rivers and several monuments ornament the city. Rome was for a long time the home of Charles Henry Smith (Bill Arp), the humorist.

ROME, N. Y., a quaint old city of historical interest, in the central part of the state. It is one of the county seats of Oneida County, and is situated on the Mohawk River at the junction of the Barge, Erie and Black River canals, fifteen miles northwest of Utica, thirty-nine miles east of Syracuse, and twenty-two miles east of Lake Oneida. The New York, Ontario & Western and the Rome, Watertown & Ogdensburgh division of the New York Central Lines meet here, and electric lines extend east and north from the city. In 1910 the population was 20,497; in 1920 it was 26,341 (Federal census). Italians and Poles predominate in the foreign element.

Rome is located in a part of the Mohawk Valley well adapted to farming and dairying, and the city is noted for its output of cheese and butter. Its shipping facilities, by rail and by water, give it commercial and industrial advantages. About 8,500 people are employed in the 125 manufacturing plants, which have a combined annual output valued at $30,000,000. The largest of these are brass and copper mills, locomotive works, knitting mills, metal bedstead factories, canneries and breweries. The post office, constructed in 1904 at a cost of $87,000, a $74,000 city hall, the State Custodial Asylum for mental defectives, Central New York Institution for Deaf Mutes, Oneida County courthouse and the home of the Y. M. C. A. are the noteworthy buildings. For advanced education there are Rome Free Academy and Saint Aloysius and Holy Name academies, and there is a fine public library. Features of interest in and near the city are Fort Stanwix Park, Lake Delta, and the great engineering triumph, Delta Dam.

Historical. The city is built on the site of Fort Stanwix, erected by the English in 1758.

The first settlement was made in 1760. Fort Stanwix was a storm center during the Revolutionary War, and in the vicinity the famous Battle of Oriskany was fought, in August, 1777. Here for the first time the enemy saw the new emblem of the nation, adopted by Congress on June 14, 1777 (see FLAG, subtitle *United States Flag*). Stanwix was the only one of thirteen frontier forts to resist the attacks of the English from the north. Rome became a town in 1796, was incorporated as a village in 1819 and was chartered as a city in 1870. The arsenal established here in 1814 was sold as a factory in 1873.

RO'MEO AND JULIET, *joo'li et,* a tragedy by Shakespeare, printed first in 1597, and in a corrected form two years later. The immediate source of the plot was a poem, the *Tragicall Historye of Romeus and Juliet,* written in 1560 by Arthur Brooke, but the story was an old one and had appeared in various forms. The theme is the love of Romeo, of the house of Montague, and Juliet, of the house of Capulet, and the tragedy is brought about by the age-long feud which exists between the two families. Over the dead bodies of the young lovers the quarrel is finally laid aside. The rôles of the title characters have always been favorites, particularly with young actors and actresses. Of recent years E. H. Sothern and Julia Marlowe are the most distinguished players who have taken the parts. Bellini and Gounod each used the Romeo and Juliet story as a basis for an opera, and Berlioz wrote a dramatic symphony on the subject. Among familiar quotations from Shakespeare's play are these:

The weakest goes to the wall.

What's in a name? That which we call a rose
By any other name would smell as sweet.

Too swift arrives as tardy as too slow.

My bosom's lord sits lightly in his throne.

ROMULUS, *rom'u lus,* the legendary first king of Rome and the founder of the city. He and his twin brother, Remus, were held to be sons of Mars and Rhea Silvia, who was a daughter of Numitor, king of Alba. Amulius, brother of Numitor, who had usurped the Alban throne, ordered the mother to be buried alive because she had broken her vestal vows and the two children to be thrown into the Tiber. The river, however, received them kindly, and bore them to a little bank, where it cast them ashore at the foot of a fig tree. Here they were found by a she-wolf, who cared for them until they were discovered by the shepherd Faustulus and by him taken to his own home. They were brought up with his children and became strong and handsome young men, fond of the sports of the shepherds but showing in all their superior birth.

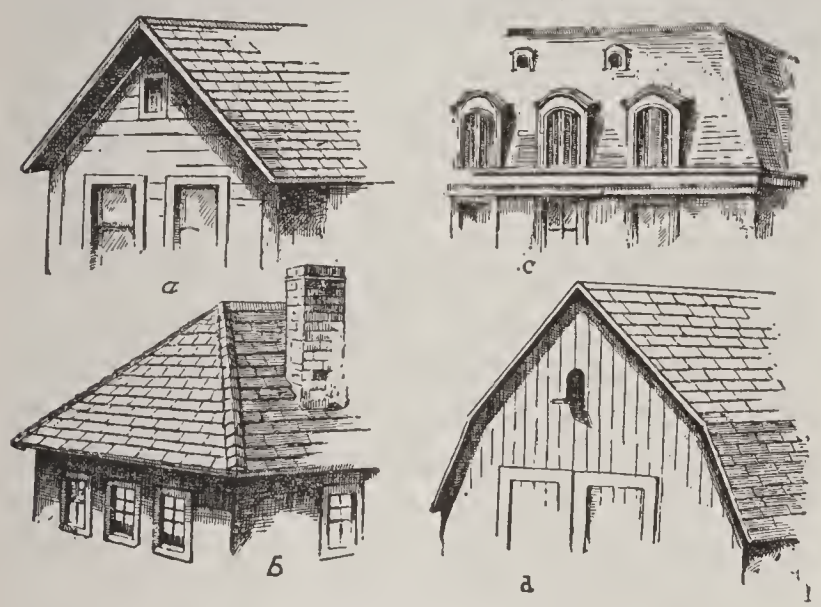
Legendary Founding of Rome. One day Remus became involved in a quarrel with the shepherds of Numitor, before whom he was taken for judgment. Romulus came to his rescue, and the bearing of the young man so impressed Numitor that he inquired as to the story of their lives. The secret of their birth being discovered, a plan was made by which the usurper Amulius was driven from the throne of Alba, and Numitor was restored. Soon afterward the young men decided to build a new city on the Tiber River, at the spot where their lives had been saved by the wolf. They fell into a quarrel as to its exact location, and submitted their dispute to the decision of the gods; the oracle having decided in favor of Romulus, he began at once to mark out the boundaries of his city with a plow. He turned the furrows inward and lifted the plow to mark the space for his gates, enclosing within the limits the Palatine Hill and a little land at its base. Remus contemptuously leaped over this boundary, saying that such a wall could never protect a city. With the exclamation "So perish whoever shall hereafter cross these walls," Romulus struck his brother and slew him, an act which he instantly regretted.

THE SUPPOSED WALL OF ROMULUS
A part of the wall believed to have been built at the founding of Rome.

His new town grew rapidly, for young men came in from every direction. The surrounding tribes looked upon the Romans as little better than outlaws and refused to allow their daughters to marry them. The dwellers in the new city, therefore, stole wives from the Sabines, with whom they were then forced to go to war. After several conflicts in which the Romans were invariably successful, the Sabines united with their new neighbors, their king ruling in common with Romulus. On the death of the Sabine king, Romulus became sole ruler.

One time after a particularly successful battle with Veii, Romulus was holding a review of his army, when suddenly darkness covered the sky and a terrible storm arose. About the head of Romulus the lightning played most fiercely, and the people all fled in dismay. When the storm had passed and they returned, their king was nowhere to be found, and they believed that his father Mars had carried him off to the dwelling place of the gods. Under the name of Quirinus, he was worshiped as a deity. A.MC C.

ROOFS. Though used primarily for shelter, throughout history roofs have been an important part of architectural designs. The buildings of each country have been given individual character by their roof types. In Northern climates, where the heavy snows of winter must be shed, the steeply-pitched roof and its companion, the pointed arch which characterizes Gothic architecture, have been developed. At the opposite extreme is the massive flat stone roof of rainless, ancient Egypt. Greek roofs were slightly inclined, and Roman roofs were sometimes flat, sometimes domed or vaulted. Japanese and Chinese, Moorish and Spanish, Romanesque and Byzantine roofs are equally distinctive. See illustrations accompanying the article ARCHITECTURE, page 322.



FOUR STYLES OF ROOFS

(*a*) Gable; (*b*) hip; (*c*) mansard; (*d*) gambrel.

Materials for pitched roofs range from the sod thatch of Irish peasant cottages and the grass thatch of Malay huts to the wooden or slate shingles and the earthen tiles of more elaborate structures. For flat, or nearly flat, roofs, corrugated or sheet metal—iron, tin, zinc, copper or lead—or tar and gravel, asphalt or special composition of felt or rubber are found satisfactory.

If the height of the roof is one-half the width which it covers, it is said to have *one-half pitch*. Similarly, roofs are frequently one-third pitch, one-fourth pitch, and so on. The horizontal distance from the edge of a roof to a point beneath its peak is called the *run;* the perpendicular height of the peak above the edge is called the *rise*. In a one-half pitch, therefore, the run equals the rise.

Consult Merriman and Jacoby's *Roofs and Bridges;* Kidder's *Building Construction.*

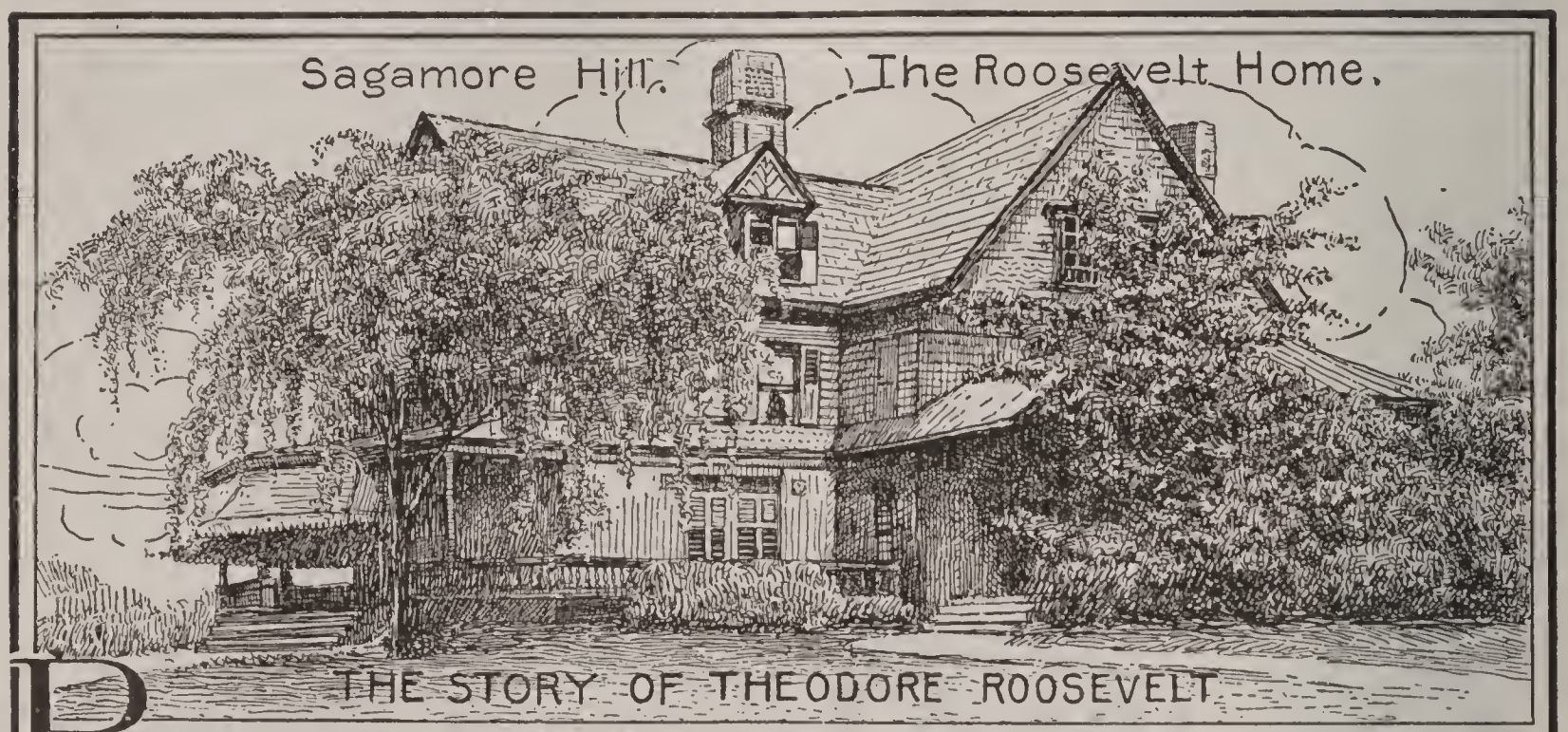
ROOK, the most common European member of the crow family, smaller than the raven and larger than the jackdaw. It differs from other members of its family by reason of the purple gloss on its black plumage, and in its habit of feeding entirely on insects and grain. Also, on coming to maturity it sheds the feathers of its face, which leaves it a grayish-white. The migrating habits of rooks vary, those in Central Europe remaining the year round in their settled place of abode, and those farther north flying southward on the approach of winter. At the nesting season they gather in communities of many hundreds, known as rookeries. When tamed, they sometimes learn to imitate human speech, and are known for their cunning and their thieving ways. The bird figures in English literature from the time of Chaucer. See CROW.

ROOK'WOOD POTTERY, a ware that is the best representative of American ideas and methods in pottery work. The institution where Rookwood pottery is made owes its inception to the experiments and influence of Mrs. Bellamy Storer. It is located in a suburb of Cincinnati, called Rookwood because of the many crows which frequent the woods in the vicinity. The factory, which was a former country home, is perched high on a hill and is as picturesque as the pottery itself. With American clays worked by American hands, Mrs. Storer determined to develop a distinctly American ware distinguished by an individual method of treatment.

Great progress has been made since the humble beginnings in 1880, when the first kiln of

Rookwood pottery was fired. The present institution is the successful outgrowth of those days of doubt and many obstacles. Most of the clays used are found in the Ohio Valley, notably at Buena Vista and Hanging Rock, Ohio, and in Tennessee and Virginia. These clays, when combined with artificial tints, produce the beautiful sea-green tones that characterize most of the Rookwood pottery of recent manufacture.

The products are divided into three classes—cameo ware, the dull-finished ware which is apparently unglazed, and the richly-glazed ware. With the exception of the primitive potter's wheel, practically no machinery is employed, since every effort is expended to produce original designs which cannot be duplicated by machinery. From the mixing of the clay to the withdrawal of the completed piece from the kiln, the ware passes through the hands of about twenty-five operators. Almost all the employees of the institution are Americans. Mrs. Storer's original plans have been faithfully followed, and Rookwood pottery has won a distinctive place in the ceramic arts of the twentieth century. See POTTERY. R.D.M.



THE STORY OF THEODORE ROOSEVELT

ROOSEVELT, *ro'zeh velt,* THEODORE (1858-1919), the twenty-sixth President of the United States, a unique figure in his generation, without doubt the most versatile man who has ever influenced American public life. An eager seeker for knowledge of all kinds, Roosevelt won distinction in many fields. Not merely must he be called a statesman, but he was always a reformer, and he was also a naturalist, a man of letters, a hunter and a sportsman. He stood in American thought as the representative of many of the great advances which his generation has made, and to an extraordinary degree his personality impressed itself on the American people. He was an advocate of a busy life, the "strenuous life," it has been called. "Speak softly and carry a big stick" is a motto which will always be associated with him, just as conservation and opposition to race suicide and to nature faking will be.

As a man of letters he took high rank for the excellence both of style and content. As a statesman he is too close to the men who want to judge him to receive fair treatment. First of all, he knew how to handle men—he was a very clever politician. But he was also a statesman, for he had vision, and the courage to make the visions real. John Morley, the English writer and statesman, returning to England after a visit to America, said that he saw two tremendous forces of nature while he was gone:

> "One was Niagara Falls, and the other the President of the United States, and I am not sure which is the more wonderful."

Roosevelt was essentially a man who did things, a man to whom the term *dynamic* was justly applied. Take him all in all, he was without doubt the most interesting political figure of his time in the world.

He was born in New York City, Oct. 27, 1858, and died Jan. 6, 1919. He was descended on the male side from a sturdy family of Dutch burghers, one of whom emigrated from Holland to New Amsterdam about 1650. For a century the Roosevelts (originally Van Rosenvelt) contracted no marriages outside their own nationality, and not until after the Revolutionary War did they begin to use English names

in place of the Jacobus, Johannas and Nicholas which were borne by the earlier members. The Roosevelts prospered. One owned real estate, others went into business, and before long they were numbered among the old aristocracy of New York.

Theodore Roosevelt, the President's father, was a successful business man who gave largely of his time and money to philanthropic enterprises of many kinds. His many generous activities were recognized by his appointment to

THEODORE ROOSEVELT

The millions who believed in him called him "Teddy." His opponents called him many things. His intense activity made a neutral viewpoint almost impossible. Almost every person was either an enthusiastic supporter of Roosevelt or violently opposed to him.

the New York State Board of Charities. President Hayes nominated him for collector of the port of New York, but the elder Roosevelt's independence in politics led the local bosses to bring influences to bear which secured his rejection by the Senate. President Roosevelt's father, and his uncle Robert (1829-1906) were both active in politics, and their lives were "a stirring summons to men of wealth, of culture and of leisure, to a more active participation in public affairs." The President's mother, who was Miss Martha Bulloch, belonged to a family as distinguished in Georgia as the Roosevelts were in New York. Mrs. Roosevelt's elder brother was a Confederate naval officer who was responsible for setting afloat the *Alabama* and other privateers and blockade runners, and a younger brother was navigating officer of the *Alabama*. Her great-grandfather was the first governor of Georgia after the Declaration of Independence was signed.

His Boyhood and Youth. Of a distinguished, aristocratic and wealthy family, young Roosevelt had many advantages in life. He had, however, the serious handicap of poor health, against which he had to fight until he reached manhood. As a boy he took all manner of gymnastic exercises, some of which seem to have carried him out on window ledges, to the alarm of the neighbors. But his mother used to say that "If the Lord hadn't taken care of Theodore he would have been killed long ago," and Theodore himself said in after years that he had made up his mind that, come what might, he would make himself strong. His schooling was occasionally interrupted by his weakness or by illness, but he made excellent progress, nevertheless, and entered Harvard in 1876.

At Harvard he was neither a "sport" nor a "grind." He belonged to exclusive societies, but also had many friends outside these small, select groups. He stood fairly well in his studies, but had ample time for boxing, wrestling, tennis and other sports. He was especially interested in natural history.

His Choice of a Career. After graduation from Harvard, young Roosevelt studied law at Columbia University and in the office of his uncle, but it seems that he had no serious intention of becoming a lawyer. The law was merely one kind of preparation for wider activities. At one time he wanted to be a professor of natural history, but he had no thought of becoming a professional writer. The year after he left college he wrote one book, *The Naval History of the War of 1812,* but he had done this rather to correct a number of errors which he had found in the histories dealing with that war. He made his entrance into politics in 1881, much to the amusement of his Fifth Avenue friends, who told him he would meet only the grooms and saloonkeepers in politics, to which Roosevelt replied that as "they are the governing class in this city, then, they must be better men than you are." He attended the meetings of the Republican ward club, and found that "the boys there were a jolly enough lot."

In the New York Legislature. In the autumn of 1881 Roosevelt was elected to the New York assembly. He was only twenty-three years old and the youngest man in the legislature, but he was soon one of the best known, both inside and outside of that body. There was a scandal concerning a certain judge. The political bosses ordered silence, but Roosevelt pressed the issue, and after a week of talking secured the impeachment of the judge. Roosevelt was reëlected for three more terms. In

1883 he received the vote of the Republicans for speaker, an honor which made him the leader of the minority. Before long, however, the bosses found that "he would not listen to reason," and they found a new leader. Roosevelt himself said that this sudden desertion taught him his first real lesson in politics:

> "It was just this; if you are cast on a desert island, with only a screw-driver, a hatchet and a chisel to make a boat with, go make the best one you can. It would be better if you had a saw, but you haven't. So with men. There is a point, of course, where a man must take his stand alone and break with all for a clear principle, but until it comes, he must work with men as they are."

Although defeated for speaker, and in disfavor with the bosses, Roosevelt was the most influential man in the assembly, and was already a power to be reckoned with. In 1884 he refused to accept another nomination for the legislature, but he attended the state Republican convention, which by shrewd tactics he and his friends managed to control. He was elected a delegate-at-large to the national convention, and the other delegates made him, a young man just twenty-five years old, the chairman of the delegation from the Empire state. Theodore Roosevelt was a national figure. He worked hard to secure the nomination of George F. Edmunds for President, and bitterly opposed Blaine, but after Blaine was nominated Roosevelt finally decided to vote for him.

Ranch Life. The year 1884 was a hard one for Roosevelt. His mother died in February; and two days later his wife passed away. He had married in 1880, on his birthday, Miss Alice Lee, of an old Boston family. These domestic sorrows and his political defeats turned his mind from politics. He had previously enjoyed many camping experiences in the Maine woods, but now he turned to the Western prairies. He bought a ranch on the Little Missouri, in North Dakota, and made ranching his business. The brand of his Elkhorn Ranch, as he called it, was the Maltese cross. The young master of Elkhorn Ranch—courageous, frank, ready to bear his share of work and hardship—soon won the respect of the hard men of the Bad Lands. They forgave him his aristocratic ancestry, his New York manners, his Harvard English, his gold-rimmed eye-glasses and even his fringed Angora "chaps," of a kind seldom seen except on the stage. Once he said to a braggart who boasted of the number of men he had killed, "Jim, I like you; but you are the nastiest talking man I ever heard." And Jim, instead of drawing a gun, admitted apologetically that "mebbe I have been too free with my mouth."

Back in Politics. Roosevelt spent the winters of 1884-1885 and 1885-1886 in New York, so he was not entirely out of touch with political affairs. He spent his vacations on the Elkhorn Ranch for a few years more, but his active ranching career ended in the autumn of 1886. He was at Elkhorn when the Independents and the Republicans nominated him for mayor of New York. Opposing him were Henry George, the Single-Taxer, and Abram Hewitt, the Democratic candidate. There was little chance of election, but Roosevelt conducted a lively canvass and felt no disappointment when Hewitt was elected. In December following this defeat, Roosevelt married Miss Edith Kermit Carew, a childhood friend.

After a honeymoon in Europe, Roosevelt returned to New York and renewed his political connections. In 1888 he went on the stump for Harrison, who rewarded him by giving him a place on the Civil Service Commission. While Roosevelt was a member the Commission adopted many measures aimed to bring public employment within reach of the people of all sections and of all parties. It began the practice of holding examinations throughout the country for clerkships in Washington, and greatly extended the scope of the civil service on the basis of "applied idealism," as Roosevelt called it.

President of the New York Police Commission. After serving on the Civil Service Commission from 1889 to 1895, Roosevelt resigned to become president of the police board of New York City. For the next two years he labored to eradicate corruption from the police force and to secure enforcement of the laws. Roosevelt was only one of four members of the board, but he was held responsible by the public for its entire work. He stopped the system, hitherto recognized, by which police officers won promotions by paying money to "the man higher up." Roosevelt was not a mere desk official. He kept in touch with the men on the streets, and any policeman might expect that at the next corner he would find himself face to face with his chief. At midnight or in the early hour of the morning the chief would sometimes appear and ask

questions. It was at this time that the cartoonist first introduced to national attention the now familiar shining teeth. A scared policeman, "seeing things at night" in the form of two rows of teeth glistening in the darkness, was a favorite subject for cartoonists.

In the Navy Department. In April, 1897, President McKinley recalled Roosevelt to Washington to become Assistant Secretary of the Navy. Roosevelt already foresaw the likelihood of a war with Spain, and he set about to put the navy in readiness. One of his first tasks was the reorganization of the system of ranking and promotion among naval officers. Target practice was one of his hobbies. To Roosevelt belongs most of the credit for whatever preparedness the American navy possessed when the war broke out. But when the war actually came Roosevelt gave his services to the nation in another capacity.

The Rough Riders. He resigned from the Navy Department in April, 1898, after he had taken the initial steps to raise the first United States Volunteer Cavalry, which was nicknamed "the Rough Riders." These riders were a remarkable lot. Most of them were plainsmen—cowboys. There were Cherokee Bill, Smoky Moore, Rattlesnake Pete, Happy Jack and others with interesting names. There were a few Indians, and an ex-city marshal from Dodge City, Kan., whose ear had been, as he explained, "bitten off." A sharpshooter from the Carolina mountains and a bear hunter from Wyoming rode side by side with "cow-punchers," stage drivers and miners. And there was McGinty, a famous "broncho buster," who could not keep step on parade for the simple reason that he had almost forgotten how to walk. There was, too, a sprinkling of Easterners, many of them college men, and there were New York policemen, eager to serve again under the ex-commissioner.

Of the motley crowd Roosevelt was at first lieutenant-colonel; Leonard Wood was colonel. Later, when Wood was made a brigadier-general, Roosevelt rose to the command, and as colonel of the regiment he led the famous charge up San Juan Hill, a charge which made the Rough Riders immortal and made Roosevelt a popular idol. (See SPANISH-AMERICAN WAR.)

Governor of New York. The Spanish-American War was only a little war, but it made Roosevelt governor of New York. The Republican party was in dire straits, and it needed new men. The "machine," headed by Senator Platt, the political "boss" of the state, agreed on Roosevelt as a savior. Without attempting concealment Roosevelt discussed the matter with Platt, much to the alarm of some reformers, who feared needlessly that he might be led astray. Roosevelt was nominated without giving pledges, and was elected by a plurality of 18,000 votes over the Democratic candidate, Augustus Van Wyck.

As governor he made a remarkable record. He worked with men of all kinds, reformers as well as machine politicians, and in almost every case got what he wanted. He directed an investigation of the state's canal system, about which there had been much talk of fraud, and persuaded the legislature to vote an appropriation for a systematic survey of needed improvements. He incurred the hostility of large corporate interests by approving a bill providing for the taxation of corporation franchises. Far from obeying the orders of the "machine," Roosevelt had made the "machine," in most instances, do as he wished. He, too, was a politician, he knew how to handle men and issues, but he did it honestly. Yet he was too troublesome a man, and the politically powerful determined to render him harmless by making him Vice-President, a political tomb from which no man had emerged with power for half a century. Senator Platt later asserted openly that he got rid of Roosevelt by forcing him to accept the nomination for Vice-President.

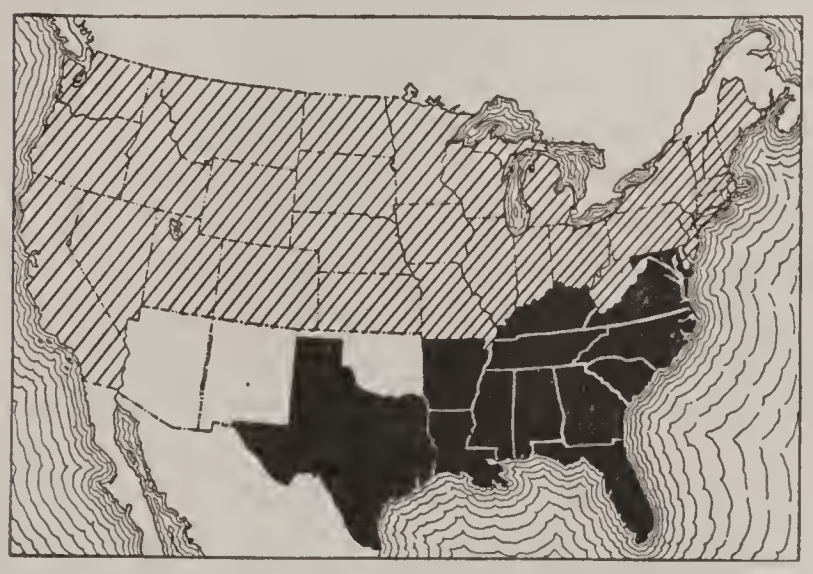
Roosevelt wanted to be governor of New York for a second term, but he finally agreed to accept the Vice-Presidency, for which the Republican convention nominated him by acclamation. In the campaign Roosevelt took an important part; he delivered nearly 700 speeches and contributed largely to the success of the ticket. McKinley and Roosevelt received 292 electoral votes to 155 for Bryan and Stevenson.

The Administration of Theodore Roosevelt

Six months after his inauguration as Vice-President, Roosevelt became President of the United States through the assassination of William McKinley. He was only forty-three years old, the youngest man who has ever become President. President Roosevelt retained the late President's policies. McKinley's plans for trust regulation, for reciprocity with other

countries, for government of the Philippines and for other policies were all advanced. So striking was the President's personality, so tremendous his influence, that his character was the chief issue in the campaign of 1904. The President said frankly that he wanted to be elected to serve a full term. He was nominated by the Republican convention by acclamation, and his election was a foregone conclusion. He defeated Judge Alton B. Parker, the Democratic candidate, by a popular majority of nearly 2,000,000 votes, and received 336 electoral votes to 140 for Parker. In his second administration he pursued in a general way the policies outlined during his first term, and the seven years and six months for which he was President constitute a single unit.

Important Legislation. During the whole of his two terms President Roosevelt wielded a tremendous influence on Congressional legislation. He advocated a larger army and navy, and one of the first important laws passed



ELECTION MAP OF 1904

States marked with lines gave their electoral votes to Roosevelt; states appearing in solid black were Democratic, supporting Parker. The white areas north of Mexico were then nonvoting territories.

reorganized these two branches. A general staff was created for the army in 1903, and a program of more rapid construction was adopted for the navy. About the same time Congress passed a new Chinese Exclusion Act and the Reclamation Act, the latter providing for the reclamation and irrigation of the arid lands of the West. Congress in 1902 made the Census Bureau a permanent branch of the government and in 1903 created a new department, that of Commerce and Labor. The Hepburn Railway Rate Act of 1906, the Federal meat inspection act and a pure-food law of the same year, the establishment of a Bureau of Immigration, a uniform naturalization law, a law increasing the salaries of the Vice-President, the Speaker and members of Congress, and, finally, the Aldrich-Vreeland Act of 1907—these are the most important laws of Roosevelt's terms. During these seven and a half years the President's support of many radical reforms alienated the more conservative members of his party, and especially in the closing years of his term there was bitter antagonism between them and him.

Foreign Relations. During the whole of President Roosevelt's administration foreign relations presented many knotty problems. For the most part these involved South or Central American republics. By far the most important concerned the Panama Canal. The Hay-Pauncefote Treaty (which see) was ratified on December 16, 1901. Two years later, after Colombia had rejected a treaty for the construction of a canal, the state of Panama revolted and was immediately recognized as an independent republic by the United States; it promptly granted to the United States the canal rights it sought. There is some evidence that the President was directly concerned in the revolt of Panama, but his action was generally approved by public opinion, and the acquisition of the Canal Zone was without question the greatest material achievement of the Roosevelt administration.

Less important in its results, but more threatening at the time, was the Venezuelan complication. Great Britain and Germany sent a joint naval expedition to force Venezuela to pay certain claims which they held against it. The bombardment of the Venezuelan ports was about to begin when President Roosevelt called on the two powers to submit their claims to arbitration. After tedious negotiations relations between Great Britain and the United States were further smoothed out by the action of the Joint High Commission in finally disposing of the Alaska boundary dispute. In San Domingo in 1907 the attempt of the European powers to enforce certain claims led the United States to assume a sort of financial protectorate over the island republic, American officials being used to collect customs duties and pay San Domingo's foreign debts with the net proceeds.

A reciprocity treaty was negotiated with Cuba in 1903. In 1906 an American provisional government was established in that island as the result of an insurrection. As soon as order was restored authority was turned back to the Cubans. The most remarkable episode in foreign relations, however, was the President's ac-

ROOSEVELT'S ADMINISTRATION
1901 1909

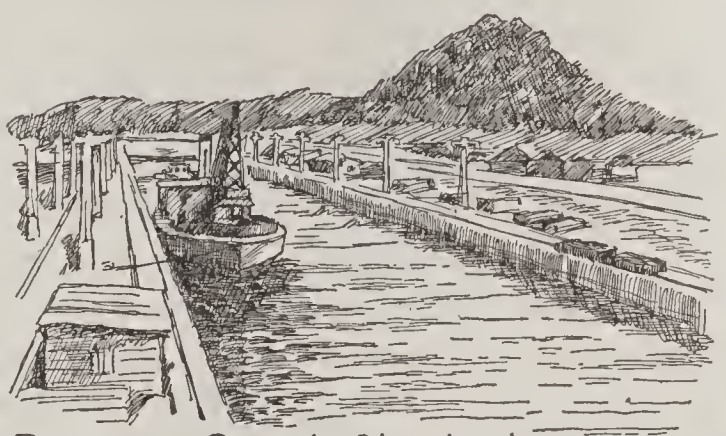
Navy Goes Around the World

Louisiana Purchase Exposition

Jamestown Exposition, Commemorating Old Jamestown

San Francisco Disaster

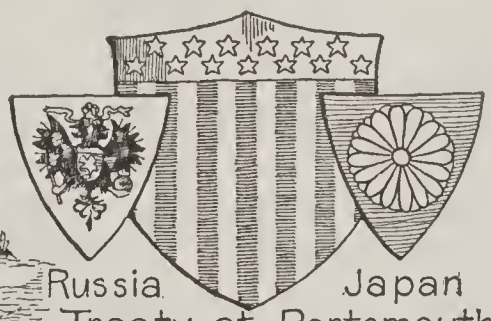
Pacific Cable Laid



Panama Canal Started

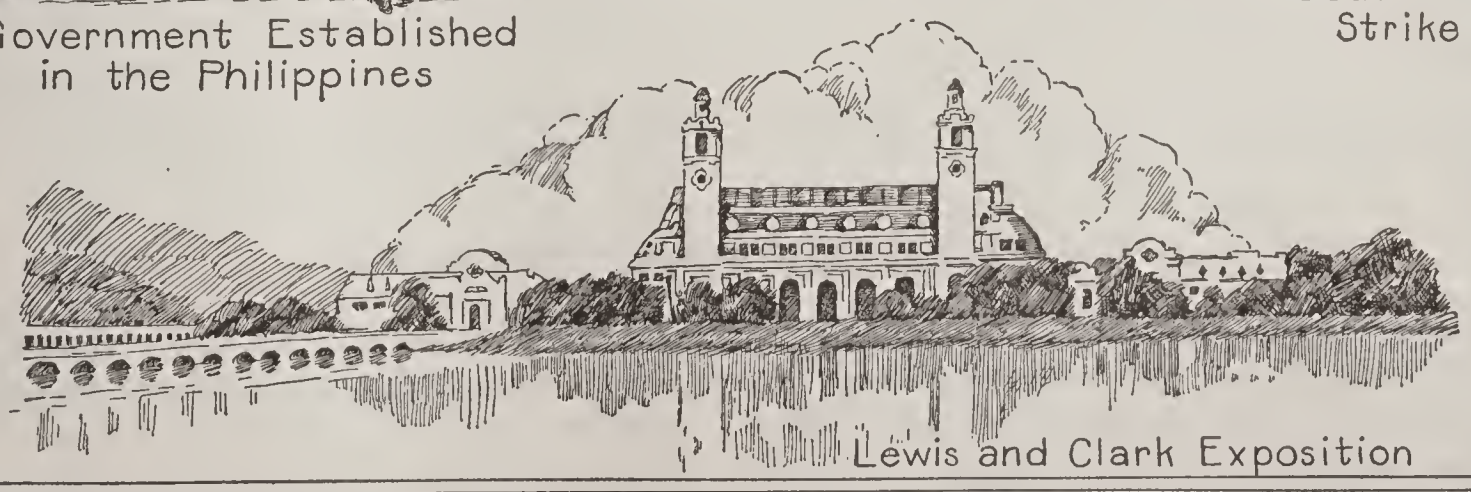
Cleveland Died, 1908

Government Established in the Philippines



Russia Japan
Treaty at Portsmouth

Anthracite Coal Strike



Lewis and Clark Exposition

tion in bringing together the Russian and Japanese peace commissioners, and thus being directly responsible for the conclusion of the Russo-Japanese War in 1905. In the next year the Nobel Prize for peace was awarded Roosevelt for his services to the world in ending this war. The successful cruise of an American battleship fleet around the world and the laying of the Pacific cable to Hawaii and the Philippine Islands were also of great importance in disclosing the degree of preparedness possessed by the United States. The dramatic voyage of the fleet was conceived and inspired by him, although naval experts predicted disaster for the ships, and its moral effect on the nations of the world was tremendous.

Antitrust Movement. One of the most important tendencies of the last years of the nineteenth century was the agitation against trusts. President Roosevelt's administration was marked by special activity in this direction, notably against common carriers. As a result of investigations carried on by the Bureau of Corporations in the Department of Commerce and Labor, the government brought suit against the Northern Securities Company, a holding company which owned the controlling interests in the Great Northern and the Northern Pacific railways. The Securities Company was ordered dissolved by the Supreme Court in 1904. Similar suits were instituted and convictions obtained against the so-called "beef trust" and other monopolistic groups. Indictments for receiving or granting rebates were voted against the Standard Oil Company, the New York, New Haven & Hartford Railway and other railways and industrial corporations. The air was constantly filled with rumors of further attacks upon "big business," and there was much criticism of the President for the encouragement he was said to be giving to possible industrial and financial disturbances. In fact, in 1907, the country suffered from a sharp financial crisis, which did not, however, leave a serious effect on industry.

Strike of Coal Miners. Although not directly connected with the antitrust agitation, a great strike of the anthracite coal miners in 1902 was symptomatic of the industrial unrest which pervaded the country. The strike lasted the whole summer, and the country faced a coal famine. The miners refused to return to work unless the owners would submit the questions in dispute to arbitration, but the owners declined to meet those demands. The President, in this crisis, called the representatives of the owners and the miners together in conference. The owners at first declined to consider arbitration, but within two weeks, when the public was aroused at the spectacle of the President's discomfiture, they agreed to it, provided the President would name a commission. The President at once named three men, Judge George Gray, Bishop John L. Spalding and Carroll D. Wright. This commission decided all questions at issue, and made peace in the anthracite coal industry.

Other Affairs. Roosevelt's term was marked by three anniversary expositions—the Louisiana Purchase at Saint Louis in 1904, the Lewis and Clark at Portland, Ore., in 1905, and the Jamestown Tercentennial at Hampton Roads, Va., in 1907. (Each of these expositions is described in a special article in THE WORLD BOOK.) In April, 1906, occurred the disastrous San Francisco earthquake and fire, which made 200,000 homeless and caused a property loss of about $500,000,000.

An event of international importance was the laying of the Pacific cable, the first American cable across the Pacific, in 1903. This cable is 7,846 nautical miles long, and touches at Guam, Hawaii and the Philippine Islands. It was later extended from Manila to Japan and to Shanghai. Oklahoma was admitted as a state in 1907. An interesting event was the adoption by Wisconsin, in 1903, of the first state-wide primary-election law for the nomination of elective officials.

The Election of 1908. It was generally understood that President Roosevelt favored Secretary-of-War Taft as his successor. Taft was nominated, and he was elected by an electoral vote of 321 to 162 for William Jennings Bryan (see TAFT, WILLIAM HOWARD), his election being due largely to Roosevelt's influence.

The Most Interesting American

African Explorations. The biographies of most Presidents come to a more or less sudden termination as soon as they leave office. Not so with President Roosevelt. When he retired from the Presidency in 1909 he was in the full vigor of middle life. He was a few months past fifty, physically and mentally as active as when he began his first term. Long walks, tennis and horseback riding—his three favorite forms of exercise—had kept him full of energy.

OUTLINE AND QUESTIONS ON THEODORE ROOSEVELT

Outline

I. Years of Preparation

(1) Ancestry and birth
(2) Boyhood and youth
(3) Education
(4) Law study
(5) Early political activities

II. A National Figure

(1) Assistant Secretary of the Navy
(2) In Spanish-American War
(3) Governor of New York
(4) Elected Vice-President

III. His Administration

(1) Death of President McKinley
(2) Legislative affairs
  (a) Reorganization of army and navy
  (b) Chinese Exclusion Act
  (c) Reclamation Act
  (d) Department of Commerce and Labor created
  (e) Railway Rate Act
  (f) Bureau of Immigration established
  (g) Pure-food law
  (h) Antitrust legislation
(3) Foreign affairs
  (a) Panama Canal question
  (b) Venezuela controversy
  (c) San Domingo
  (d) Reciprocity with Cuba
  (e) Insurrection in Cuba, and American provisional government
  (f) Treaty of Portsmouth
  (g) Cruise of United States fleet around the world
(4) Internal affairs
  (a) Anthracite coal strike
  (b) Expositions
    1. Louisiana Purchase
    2. Lewis and Clark
  (c) San Francisco earthquake and fire
  (d) Laying of Pacific Cable
  (e) Admission of Oklahoma

IV. Later Life, and Character

(1) African explorations
(2) Breach with Republican party
(3) Formation of Progressive party
(4) South American travels
(5) Activities during War of the Nations
(6) Character summary
(7) Publications

Questions

What actions of the President's alienated the conservative members of his party during his administration?

What handicaps did Roosevelt have to overcome in his youth?

Why can he be called with justice the "most versatile man who has ever taken a part in American public life?"

In what way, besides his actual participation in the struggle, did Roosevelt help to win the Spanish-American War?

What unusual honor was shown him when he was twenty-three years old? When he was twenty-five?

How did he sum up his ideas of the methods to be employed in dealing with men in politics?

How did the cartoons current during his term as president of the police board show his attitude toward his work?

When was he elected to a high office that his party might be rid of him?

When did he, according to good authority, help to foment a revolution, and what was the general opinion concerning his action?

What two exploring trips did he take after his terms as President, and what did he accomplish on each one?

If ever there was an "apostle of energy" it was Roosevelt. Inactivity for him was impossible.

Immediately after the close of his term Roosevelt sailed for Africa with a party including his son Kermit and a number of naturalists. The object of the expedition was not merely sport, to hunt big game, but also to secure specimens for the zoölogical collection of the Smithsonian Institution at Washington. *African Game Trails* is the record he wrote of this year in the wilderness. His return to the United States by way of Europe in the spring of 1910 was a sort of triumph. Roosevelt delivered lectures at the Sorbonne, at Paris, and at the universities of Berlin, Christiania and Oxford. He met Emperor William II and King George V and was fêted and honored everywhere.

Breach in the Republican Party. While Roosevelt was away there occurred the Ballinger-Pinchot Controversy (see PINCHOT, GIFFORD). This controversy was merely one of the signs which indicated how widely the radicals and insurgents in the Republican party had become separated from the conservatives. On his return from Africa Roosevelt at first took no part in politics. Later in the year, however, he made a speaking tour of New York in support of Henry A. Stimson, the Republican candidate for governor, and about the same time he let it become known that he supported Pinchot, not Ballinger. President Taft had supported Ballinger, one of the circumstances which had made him the leader of the conservative Republicans. Between 1910 and 1912 the breach between the two leaders rapidly widened, Roosevelt continually advocating new and radical reforms, such as the elimination of the "twilight zone" which surrounded the powers of the Federal government, the introduction of the initiative, the referendum and the recall of judicial decisions as well as of judges, and a large degree of military and naval preparedness.

Taft, on the other hand, became increasingly conservative, and as the election of 1912 drew near the struggle between the two elements for control of the party became intense. Roosevelt at first supported La Follette for the Republican nomination, but later sought it for himself, in spite of the two-term custom. The story of the Republican convention of 1912 is told elsewhere (see TAFT, WILLIAM HOWARD). The Roosevelt delegates were unsuccessful in their attempts to get control of the convention. Claiming that the "steam roller" had run over them, that their rights had been ignored, and their votes "stolen" from them, the Roosevelt delegates finally withdrew from the convention, and held one of their own. Out of this secession grew the Progressive party (which see). The campaign was bitter, the Republicans and the Progressives both indulging in violent personal attacks on the characters of the candidates. Three weeks before the election, while entering his carriage to deliver an address at Milwaukee, Roosevelt was shot by an irresponsible man but was not seriously wounded. With characteristic courage, he continued his way to the hall, delivered his address, and then allowed the physicians to take charge of him. For the last weeks of the campaign Roosevelt lay in a hospital, recuperating. The election showed the former President's amazing strength with the people. The Republican party was split into two sections of nearly equal strength; Roosevelt received 4,119,507 votes; Taft, 3,484,956. Wilson, the Democratic candidate, received the entire vote of his party, polling 6,293,019 votes.

Exploring Again. After the election Roosevelt made an exploring trip into the interior of Brazil. There he discovered a hitherto uncharted river, formerly known as the River of Doubt. It is now called Rio Téodoro, in his honor. In South America Roosevelt made speeches in several of the larger cities, and helped to strengthen the friendly feeling existing between the two continents.

President Wilson's Chief Critic. Beginning in 1913 and continuing until 1917, when the United States entered the War of the Nations, Roosevelt was much in the public eye as the chief critic of President Wilson's foreign policy, first towards Mexico and later toward Germany. He objected especially to the "watchful waiting" policy. When the War of the Nations broke out Roosevelt at first declared that the United States had no reason for interference, but later he recognized the vast responsibilities resting on the United States. Especially after the sinking of the *Lusitania* he was vehement in his demands that the President resort to force. When finally war was declared against Germany, Roosevelt wanted to lead a volunteer brigade to France without waiting for the mobilization of the new national army to be raised by conscription. An act of Congress authorized the President to enrol such a volunteer brigade, but President Wilson decided that it was better to wait for the regular army. It is worthy of note, how-

ever, that Roosevelt's four sons all volunteered for service and went to France. Theodore, Jr., in France, rose to the rank of lieutenant-colonel; Archie became a captain; Quentin chose aviation, was shot down by a German and buried in France; Kermit, a major, served both in Mesopotamia and in France.

Roosevelt as Man of Letters. His literary work is of high character, and is itself sufficient to have given him a wide reputation. His writings have been collected in twenty-five volumes, ranging from scholarly historical essays or biological studies to entertaining narratives of his personal experiences. He was, in 1912, president of the American Historical Association and he was the thirteenth man elected to the American Academy of Arts and Letters.

Of his many books the following are most important, some of them being standard works in their respective fields: *The Naval War of 1812,* written in 1882; *Life of Thomas Hart Benton* (1887); *Life of Gouverneur Morris* (1887); *The Winning of the West,* in four volumes, which appeared from 1889 to 1896; *History of New York City* (1890); *American Political Ideals and Other Essays* (1897); *The Rough Riders* (1899); *Life of Oliver Cromwell* (1900); *The Strenuous Life* (1900); *True Americanism,* a collection of his addresses delivered in Europe in 1910; *The New Nationalism,* a discussion of political ideals of the day, a book whose title became a current phrase in popular speech; *History as Literature and Other Essays* (1913); *Through the Brazilian Wilderness* (1914); *Life Histories of African Game Animals* (1914); *America and the World War* (1915). W.F.Z.

Consult Roosevelt's *Autobiography;* Riis' *Theodore Roosevelt the Citizen;* Burroughs' *Camping and Tramping with Roosevelt;* Morgan's *Theodore Roosevelt, the Boy and the Man;* Washburn's *Theodore Roosevelt.*

ROOT, in mathematics, a number or quantity which, when multiplied by itself one or more times, produces a given number or quantity. For example, since $2\times2=4$, 2 is a root of 4; again, since $3\times3\times3=27$, 3 is a root of 27. The various phases of this subject are discussed fully in these volumes in the articles Evolution; Involution; Square Root; Cube Root.

ROOT, Elihu (1845-), an American lawyer, statesman, diplomat and administrator who is credited by his fellow citizens with the possession of "the best brain in the United States." He became so dependable a lawyer that corporations have been willing to pay him thousands of dollars in a single fee for his opinion expressed in one word, "Yes," or "No." His eminence in corporation law has earned for him the distrust of those who profess to believe that a man cannot serve great private interests and at the same time be true to a public trust. Root's career has disproved this implication, for few men have given as disinterested service to their country as he, regardless of its effect upon his personal fortunes.

ELIHU ROOT

Elihu Root was born at Clinton, N. Y., the seat of Hamilton College, in which school his father was professor of mathematics. There the young man received a classical training, after which he was graduated in law at New York University. He earned money for his law course by teaching in Rome (N. Y.) Academy in 1865. Since then thirteen universities have conferred honorary degrees upon him.

He was admitted to the bar in 1867, and began the practice of law in New York City in the same year. Not until 1883 did he enter public service. In that year he became United States District Attorney for the Southern District of New York, which post he resigned in two years because the kind of legal service involved was not to his liking. A brief summary of his later public activities includes the following important commissions and honors:

He was a delegate-at-large to the New York state constitutional convention in 1894, and served as chairman of its judiciary committee. Twenty-one years later, at the state constitutional convention of 1915, at the age of seventy, he was president of that body.

Upon the retirement of Russell A. Alger as Secretary of War in the McKinley Cabinet, in 1899, Root became his successor. He continued in the position under Roosevelt, until 1904. In this office he planned the War College; reorganized the system of administration of the Department, instituted the General Staff and enforced civil service rules, as far as can be made practicable, for promotions. Alger left the Department in disorder, after the scandals incident to the Spanish-American War; Root was highly praised for the ability with which he restored order and for his administrative genius, which showed in the military plans he laid for the con-

duct of the armies then stationed in Cuba and the Philippines. While Secretary of War he served on the Alaska Boundary Commission (see page 143).

For a year he practiced law, then in July, 1905, was appointed Secretary of State in the Roosevelt Cabinet, succeeding John Hay. This post was relinquished early in 1909, for he had been elected by the New York legislature as a United States Senator.

He entered the Senate in March and declared at once his intention not to seek a second term and accordingly returned to private life in 1915. During his term as Senator he was counsel for the United States in the North Atlantic fisheries arbitration (1910); was appointed in 1910 as a member of the Permanent Court of Arbitration at The Hague; and in 1913 was made president of the trustees of the Carnegie Institution at Washington.

The Nobel Prize for Peace for 1912 was awarded Mr. Root (see page 4243).

His next public service was again international in character. In 1917 he became chairman of an American commission to the new republic of Russia, by appointment of President Wilson. It was the delicate duty of the commission to do all possible to unite the discordant elements of Russia for vigorous prosecution of their part in the War of the Nations, to help organize political and industrial life. In 1921 he was an American representative to the conference on limitation of armaments. E.D.F.

ROOT, GEORGE FREDERICK (1820-1895), an American composer, was born at Sheffield, Mass. He studied music in Boston and in 1844 went to New York City, where for some years he was organist in the Church of the Strangers. In 1859 he organized the music-publishing firm of Root & Cady in Chicago, and just after the beginning of the War of Secession made a fortune through the publishing of patriotic songs, mostly of his own composition. Among these were *Tramp, Tramp, Tramp, the Boys Are Marching,* of which more than 500,000 copies were sold, *The Battle Cry of Freedom* and *Just Before the Battle, Mother.* His quartette, *There's Music in the Air,* also gained much popularity. These songs, while not possessing great musical or literary merit, had considerable vigor and came at a time when all efforts to increase American patriotism were cordially welcomed. Among his compositions of a much higher quality were the cantatas *The Pilgrim Fathers* and *Belshazzar's Feast.*

ROOTS constitute one kind of the three vegetative organs essential to plant growth, the others being the stems and the leaves. The chief functions of roots are to hold plants in their places in the soil and to supply them with water. The first formed roots, those that grow directly from the rudimentary stem (see GERMINATION), are called *primary;* branches of the primary roots are called *secondary,* and branches of these, *tertiary.* Roots which grow on the stem or in other unusual places are known as *adventitious.* In most cases the root system divides and subdivides until the smaller rootlets are covered with tiny *root hairs.* These play an important part in the development of the plant by taking up water from the soil.

According to the medium in which they grow roots are classified as *soil, aerial* (or *air*) and *water* roots. Air roots are sometimes developed by plants which are anchored in the ground, as in case of the poison ivy, but there are other plants which grow entirely in the air, as many kinds of orchids. The water hyacinth and the floating duckweed are examples of plants that have roots adapted to live in water. Roots that derive nourishment from other plants are called *parasitic;* such are the roots of the dodder and the mistletoe.

Roots are also distinguished in regard to form. A primary root which grows to be much larger than any of its branches is called a *taproot,* and if this taproot becomes much thickened and develops as a storehouse for nourishment, as in case of the carrot or turnip root, it is said to be *fleshy.* A cluster of thickened primary roots, such as those produced by the sweet potato and dahlia, would be called *fasciled* roots. Thread-like roots, such as those of grass, are *fibrous.* In regard to their length of life roots are classified as *annuals, biennials* and *perennials* (terms explained in these volumes under their respective headings).

Related Subjects. For the picture of a young root system see page 2482, under GERMINATION. On page 1587, in the article CORN, there is a diagram showing how roots and their branches penetrate the soil. How roots often grow much farther below ground than the stem does above ground is illustrated under DANDELION, page 1698. See also in the article BOTANY pictures of parasitic plants (page 859) and of fleshy roots (page 860).

ROPE. The distinction between a rope and a cord is in the size alone. The term *rope* is applied to a cord one or more inches in diameter, and the term *cordage* to all smaller cords down to the size of binder twine, excepting ropes made of wire. Ropes vary in size from those an inch in diameter to the huge ship cables more than fifteen inches in circumference.

Hemp, including manila and sisal, also flax, jute, cotton and coir, the latter being the fiber from the husk of the cocoanut, are the materials used in the manufacture of ropes. Manila

hemp, which is obtained from the Philippine Islands, is the material most extensively used. Sisal is obtained from Yucatan and is sometimes called Yucatan, or Mexican, hemp. Jute comes from the East Indies and from some parts of Russia. The manila hemp is preferred for all cordage where strength is required, because its fibers are longer and stronger than those of sisal or jute. Cotton makes the strongest rope, but its use is limited because of its expense.

Manufacture. The processes in rope making are practically the same for all materials, and with few exceptions the work is all done by machinery. Hemp is received at the factory in bales averaging about 270 pounds each. The fiber is taken from the bales, loosened, and sprinkled with oil. It is then passed in layers through a machine called a *spreader.* From the spreader the hemp passes to the *breaker,* which straightens out the fibers and arranges them in a ribbon called the *sliver.* The sliver passes through several breakers, each finer than the other, until the fiber is prepared for spinning. As the fiber is spun into yarn it is wound on large bobbins holding about 1,000 yards each. The yarn is twisted into strands, and the strands are twisted into a rope.

The smaller ropes consist of three strands; this number is increased for larger ropes. Cables used in drilling wells vary in size from one and three-fourths to two and seven-eighths inches in diameter and in length from 1,400 to 3,500 feet; these are made by twisting together three strands of manila rope. Such cables are light, strong and flexible.

Strength of Ropes. The strength of a rope depends upon its size and the material of which it is made. A hemp cord 1.53 inches in circumference will withstand a strain of 1,670 pounds. One 6.9 inches in circumference will lift a weight of 33,808 pounds. A cotton rope 6.51 inches in circumference will lift a weight of 23,258 pounds.

Wire Ropes. Wire ropes are made of a certain number of wires twisted together, steel wire making a considerably stronger rope than iron wire. The twisting is done in the same manner as in laying the strands of a hempen rope. Wire ropes are extensively used for cables, for the rigging of ships and in derricks for lifting heavy weights, and for many other purposes they have entirely displaced fiber ropes. W.F.R.

RORQUAL, *rawr'kwahl,* the largest and most numerous group of whales, species of which are found in all waters. The rorqual has a head comparatively small and flat, a long, slender body, a tail much compressed before widening into "flukes," short flippers, a dorsal fin and a throat arranged in folds. The blue whale, largest of known animals, is a rorqual. It sometimes reaches a length of from eighty to one hundred feet, and has sixty-four vertebrae, sixteen of which bear ribs. The whalebone of the rorqual whales is small in quantity and of poor quality, and the blubber is less abundant than in other whales. See WHALE.

ROSAMOND, *roz'a mund* (about 1140-about 1176), the mistress of Henry II of England, generally known as "fair Rosamond." Most of the stories told concerning her are mere legend; there is not even definite information as to who her father was nor as to the length of time she was Henry's mistress. In later centuries there grew up romantic tales of a woodland bower built at the center of a labyrinth through which her royal lover was guided by a clue; and fourteenth-century chroniclers declared that she died of poison administered by Eleanor, Henry's queen. She was buried in the nunnery church of Godstow, but in 1191, Hugh, Bishop of Lincoln, had her body moved to the chapter house.

ROSA, MONTÉ, *ro'zah, mohn'tay.* See MONTE ROSA.

ROSARIO, *ro sah'ri o,* a rapidly-growing city on the Paraná River, in the northeastern part of Argentina, South America. It is situated 175 miles northeast of Buenos Aires, the largest city on the continent, and is second to that place in size among Argentine cities. Rosario is an important port for river and foreign trade, as well as one of the foremost railway centers in the province of Santa Fé, and exports large quantities of grain, flour, sugar, wool and meats. The city has the largest sugar refinery in Argentina, besides flour mills, breweries and factories producing a variety of commodities. Rosario has fine schools and hospitals and a cathedral, and is healthful and up-to-date. Population in 1918, 222,592.

ROSARY, *ro'za ri,* a string of beads, made of wood, pearl or stone, by which prayers are counted. The rosary commonly used in the Roman Catholic Church consists of a circle of fifty small beads, divided into equal sections by four large beads. A pendant is attached which has two large beads, three small ones and a crucifix. On the large beads are said the *Pater Nosters;* on the small ones, the *Ave Marias,* and on the crucifix the *Apostles' Creed.* During the recitation of the rosary, the various mysteries of the faith are meditated upon, and at the conclusion of each group of *Ave Marias* a doxology is said. The complete rosary consists of three

recitations of the ordinary rosary, during which there is a reflection upon fifteen mysteries. Saint Dominic is credited with introducing this form of devotion into the Roman Church. Mohammedans and Buddhists also make use of beads in their prayers.

The Song. One of the songs of the present generation which has touched the hearts of the people and bids fair to become a permanent addition to the world's music is *The Rosary,* composed by Ethelbert Nevin (which see). The words, by Robert Cameron Rogers, are given a remarkably harmonious musical setting. They are as follows:

The hours I spent with thee, dear heart,
Are as a string of pearls to me;
I count them over ev'ry one apart,
My rosary, my rosary!
Each hour a pearl, each pearl a pray'r
To still a heart in absence wrung:
I tell each bead, unto the end,
And there a cross is hung!
O memories that bless and burn!
O barren gain and bitter loss!
I kiss each bead, and strive at last to learn
To kiss the cross, sweetheart! To kiss the cross.

ROSE, a name that has come to be a symbol of fragrance and loveliness, borne by a genus of flowers found in all parts of the north temperate regions, and unsurpassed in beauty of form and color. No flower name brings to the mind more varied and more beautiful pictures than this—pictures of the sweetbrier, the loveliest wild flower of the country roadsides; of its delicately-reared cousin, the fragrant American beauty, whose rich red petals are so soft and smooth they seem to be made of velvet; of white and yellow roses and roses showing every shade of pink and crimson. References to the rose in literature and poetic tributes to this flower are numberless. The one which follows is typical, and is from the pen of Thomas Moore, who also wrote that favorite rose song, *The Last Rose of Summer:*

Rose! thou art the sweetest flower
That ever drank the amber shower;
Rose! thou art the fondest child
Of dimpled Spring, the wood-nymph wild.

Of the wild rose it has been said that—

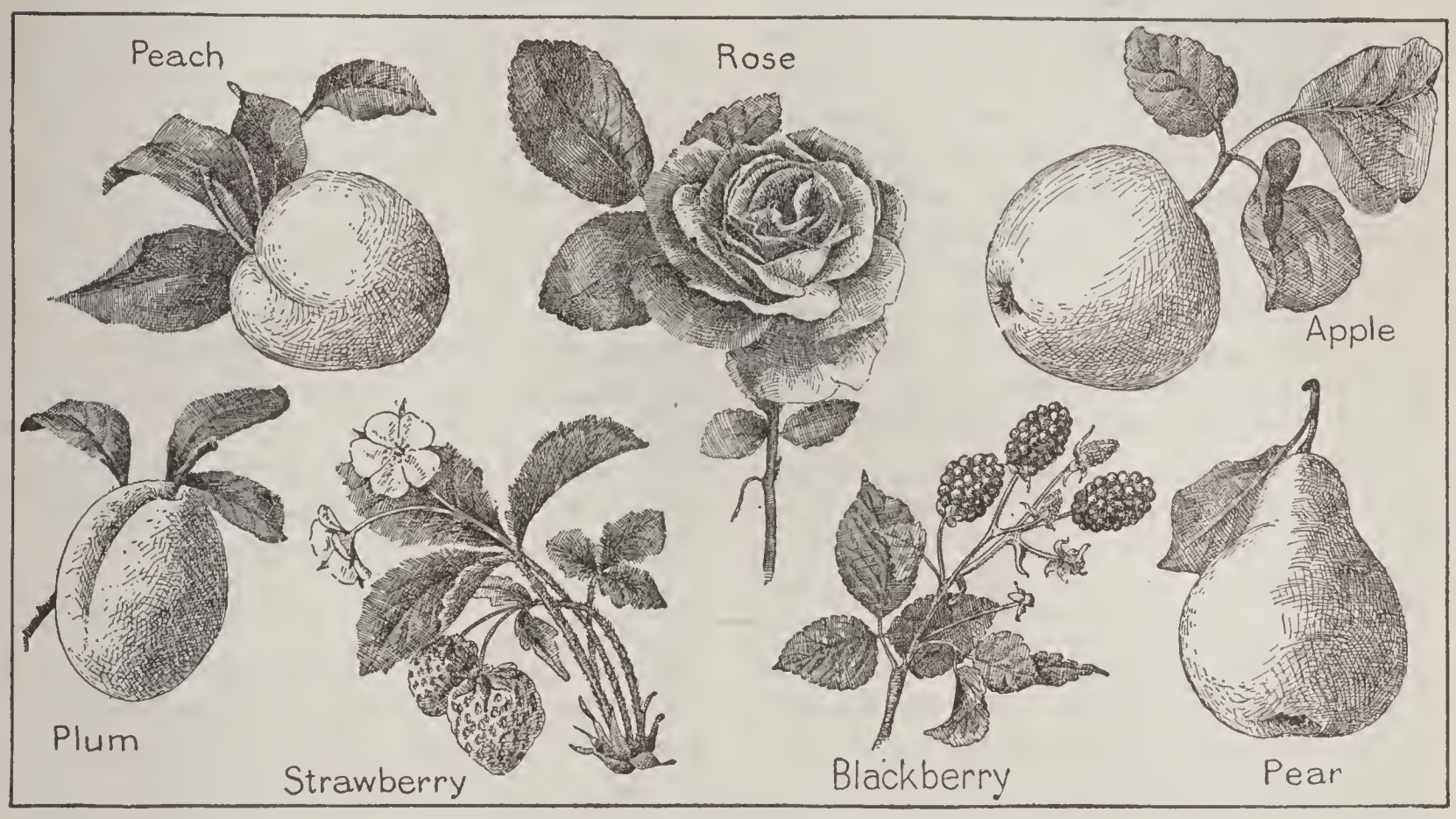
Our sweet, autumnal western-scented wind
Robs of its odors none so sweet a flower,
In all the blooming waste it left behind,
As that the sweetbrier yields it.

In English history a red and a white rose were the respective emblems of the rival houses of Lancaster and York (see ROSES, WARS OF THE). How England came to adopt the red rose as its national emblem is told in these volumes in the subtitle *National Flowers,* under the heading FLOWERS. Persia has for its national flower the Cherokee rose, a white Chinese rose that flourishes in the Southern United States; this is the state flower of Georgia. New York also has adopted the rose as its state flower (see subtitle *State Flowers,* in article FLOWERS, and also subtitle *Language of Flowers*). Roses flourish particularly well in mild climates like those of Southern France and the Pacific coast regions of the United States. In Portland, Ore., which is preëminently a "Rose City," a day in June is set aside each year for the celebration of the carnival of roses, and this custom is followed in other cities of the West.

Kinds of Roses. The rose genus has given its name to one of the most important families of the plant kingdom (see *Rose Family,* below). Of this family it may be considered the type. Roses grow in such a variety of soil and climate and adapt themselves so readily to cultivation that different varieties have been developed by the hundreds. Botanists disagree widely in their classifications, the estimates for number of species of roses ranging from thirty to 250. In its natural state the rose plant is an erect or climbing shrub, which bears thorns and single flowers having five petals. The flowers borne by cultivated varieties are generally double, and some forms have been produced that are thorn-

less. Floriculturists recognize two main classes of cultivated roses—those that bloom once a year, usually in early summer; and those that flower more than once in a single season. The latter are known as *perpetual,* or *summer and autumn,* roses.

The summer-flowering roses are represented by such groups as the *Provence, damask* and *French, alba, brier, evergreen, multiflora* and *pompon;* the perpetual by the *hybrid perpetual, hybrid tea, moss, Bourbon, China, musk, perpetual brier* and *Ayrshire.* The descriptions of these groups and of the scores of varieties belonging to them would fill a small volume.



SOME MEMBERS OF THE ROSE FAMILY

Florists are especially interested in the following, as they are among the most popular cut flowers for winter purchase: the white *bride,* pink *bridesmaid,* yellow *pearl of the garden,* blush *golden gate,* red *American beauty,* crimson *liberty* and cherry red *Ulrich Brunner.* For out-of-door growth there is probably no more satisfactory class than the hybrid tea roses, for they are hardy and vigorous. The Killarney roses, everywhere popular because of their beautiful pink color and delicious perfume, are among the best of this group.

How to Grow Roses. In selecting a plot for a rose garden one should choose a site protected from cold winds and open to the sun for several hours of the day. A deep, rich loam is usually the best soil for these flowers, but hybrid tea roses can be grown in sandy and gravelly soil. Whatever the soil, it must be well drained. If artificial drainage is necessary this may be secured by placing a layer of small stones or gravel about two feet below the top soil and sloping it so as to carry off the surplus water. Roses, like children, cannot be healthy if their feet are wet. A few weeks before planting, one should mix the soil, to a depth of two feet, with about one-third its bulk of rotted manure. Rose roots must not be allowed to come in contact with fresh manure, for, in the language of the gardener, it will give them indigestion.

The time for planting depends on variety of rose and on location. Though some hardy roses can be planted in autumn, the general rule is to plant in the spring. When the stems are received from the greenhouse see that the roots are protected from the drying action of the winds until they are put in the ground. If necessary, cover them with burlap or similar material, and keep them damp. The holes should be deep enough to permit the roots to point downward and to slant outward, for they must not lie flat. Care should be taken to have the plants so arranged that the beds can be easily watered and weeded. A good, general rule is to have the beds not over five feet wide, and the rose plants from eighteen inches to two feet apart each way, according to their spreading habits. An essential point in successful rose growing is to keep the surface soil loose during the growing season (well into July in case of spring planting). This may be done with a hoe and a sharp steel rake.

The Rose Family. Botanists combine all members of this family of plants under the name *Rosaceae* (pronounced *ro za'se a*). In the family are about 2,000 species of trees, shrubs and herbs, and it is represented by some of our most valuable fruits and loveliest flowers. To the rose family belong a large proportion of the commercial fruits of the temperate regions, notably the apple, pear and quince, the berries, and the peach, apricot, plum and cherry. Its numerous ornamental plants include the rose, the meadowsweet, the mountain ash and the hawthorn. Many useful products are yielded by rosaceous plants, such as oil of bitter almonds, attar of roses and several fine cabinet woods. The plants of this family bear regular flowers, each having five petals, a five-lobed calyx, numerous stamens and one or more carpels (see FLOWERS, subhead *Flower Structure*). As they are seed-bearing plants they are classed as *angiosperms,* and because they produce two seed leaves they belong to the *dicotyledonous* plants (see subhead under COTYLEDON). B.M.W.

Consult Thomas's *The Rose Book;* Sanders' *Roses and Their Cultivation;* Pemberton's *Roses: Their History, Development and Cultivation.*

Related Subjects. The reader is referred to the following articles in these volumes:

Angiosperms	Flowers
Attar	Hawthorn
Cotyledon	Mountain Ash

ROSEBERY, *rohz'ber i,* ARCHIBALD PHILIP PRIMROSE, Earl of (1847-), a distinguished English statesman who succeeded to the title in 1868 on the death of his grandfather. He was born in London, studied at Eton and at Christ Church, Oxford, and in 1868 took his seat in the House of Lords. There he speedily acquired a reputation as a forceful speaker, and by advocating measures for bettering the condition of the working classes won such popularity as usually comes to members of the Lower House rather than to those of the Upper. His first office was the Undersecretaryship for Home Affairs, which he received in 1881 and held for two years, resigning because there was considerable opposition to a member of the House of Lords holding that post. In 1884 he became first commissioner of works, with a seat in the Cabinet, and although he went out of office with the Liberals in the next year, he became Secretary of State for Foreign Affairs in the brief Ministry of William E. Gladstone in 1886. Meanwhile he had been chosen lord rector of Aberdeen University in 1878 and of Edinburgh University in 1880.

In 1889 Lord Rosebery became chairman of the first London County Council, and in 1892 was given by Gladstone the post of Foreign Secretary in the new Liberal Cabinet. In this position he avoided trouble with France over the question of Siam and urged the control by Great Britain of the Upper Nile Valley and of Uganda. When Gladstone resigned in 1894 Rosebery became Prime Minister, and the appointment gave general satisfaction, although the Ministry endured for only fifteen months. Lord Rosebery remained leader of the Liberals, however, until October, 1896, when he broke with the party on the question of intervention in Turkey, strongly recommended by Gladstone, to check Armenian atrocities (see ARMENIA). From that time he took no part in party politics, though retaining all his old interest in public affairs. During the South African War he urged the necessity of support of the government by all parties though he was far from approving the conduct of the war and saw great necessity for army reform.

Lord Rosebery is the author of various publications, including *William Pitt; Appreciations and Addresses; Sir Robert Peel; Napoleon; Cromwell,* and *Chatham: His Early Life and Connections.* He has always been keenly interested in sports, and three times won the Derby —once while he was Prime Minister.

Consult McCarthy's *British Political Portraits.*

ROSECRANS, *ro'ze kranz,* WILLIAM STARKE (1819-1898), an American soldier and brigadier-general in the Union army during the War of Secession. He was born at Kingston, O. After graduating at West Point in 1842, he served in the army as civil engineer until 1854. At the beginning of the War of Secession he volunteered as aide to General McClellan, and when the latter was appointed commander of the Army of the Potomac, Rosecrans was commissioned brigadier-general and placed in command in West Virginia. In 1862, after the evacuation of Corinth by the Confederates, he was given command of the army in Mississippi and successfully defended the city against Price and Van Dorn, but in 1863, as commander of the Army of the Cumberland, he was defeated by Bragg at Chickamauga (see CHICKAMAUGA, BATTLE OF). Shortly afterwards Rosecrans was succeeded by Thomas as chief of the Army of the Cumberland, and eventually was relieved of all authority. At the close of the war he resigned from the army, and in 1868 was appointed minister to Mexico. From 1881 to 1885 he was a member of Congress from California, and from

1885 to 1893 was register of the United States Treasury. His rank of brigadier-general was restored to him by Congress in 1889.

ROSEMARY, *rohz'ma ri,* an evergreen shrub of the mint family, loved for the aromatic fragrance of its leaves. It is a native of the Mediterranean region. Rosemary grows from four to eight feet high and bears dark green leaves with a white under surface, and tiny pale-blue flowers. When seen in masses it looks like blue-gray mist blown over the meadows from the sea. The name, in fact, is derived from the Latin *rosmarinus,* meaning *sea dew.* Rosemary yields an oil which is used chiefly in perfumes and in aromatic waters. The plant is an emblem of fidelity and remembrance. In *Hamlet* occurs the often-quoted remark of Ophelia, "There's rosemary, that's for remembrance."

The American *marsh rosemary,* common in the salt bogs of the Atlantic states, is a member of the leadwort family.

ROSES, Wars of the, the name given in English history to the struggle which took place in the latter part of the fifteenth century between the House of York and the House of Lancaster for the possession of the English throne. The House of Lancaster took as its emblem a red rose, the House of York a white rose, and from these insignia came the name given to the conflict. The wars began in 1455 with the Battle of Saint Albans and closed with the Battle of Bosworth, in 1485. At the outbreak the king was Henry VI, a grandson of the Lancastrian Henry IV, who had seized the throne in 1399; his chief opponent was Richard, Duke of York. During the struggle Henry was deposed and Edward IV of the House of York was crowned king; Henry was reinstated and a second time forced to give up the royal authority to Edward. The Yorkists held the royal power without active opposition until the accession of the unpopular Richard III, whom a rising under the Duke of Richmond, head of the Lancastrian House, drove from the throne. Richmond was crowned king as Henry VII, and by marrying Elizabeth, daughter of Edward IV, he united the two rival houses. See Lancaster, House of; York, House of.

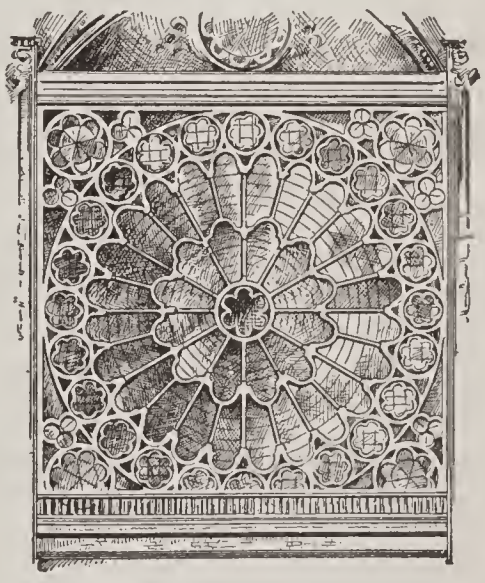
Consult Gairdner's *The Houses of Lancaster and York.*

ROSETTA, *ro zet'a,* **STONE,** the stone which gave to the world the key for the translation of the long-lost ancient Egyptian language (see Hieroglyphics). It is inscribed with a decree of the Egyptian priesthood, which had assembled at Memphis in 195 B. C. The decree, issued in honor of Ptolemy V Epiphanes (205-181 B. C.), was written in hieroglyphics, or picture writing, in demotic, a simplified form of Egyptian writing, and in Greek. Scholars were able to decipher the Egyptian texts by comparing them with the Greek, and in this way they found the clue to the hidden characters of the language of the ancients. The Rosetta Stone, now in the British Museum, is composed of black basalt. It was found near Rosetta, Egypt, in 1799 by a French officer of Napoleon's engineering corps. Parts have been broken away, and at present it is three feet, nine inches in height, eleven inches in thickness, and two feet, four and one-half inches in breadth.

THE ROSETTA STONE
As seen in the British Museum, London.

Consult Budge's *A History of Egypt;* Sharpe's *Rosetta Stone in Hieroglyphics and Greek.*

ROSE WINDOW, a large, circular window divided by slender bars into compartments, used in Gothic churches. Usually a rose window is formed of beautifully-colored glass, but it is frequently of plain glass; the name is not due to color, but to its shape. When the tracery radiates from a center, or is more distinctly committed to a spoke-like arrangement, the window is often called a *Catherine wheel, marigold* or *wheel window.* The rose window was a feature in the church architecture of the thirteenth and fourteenth centuries in France and England. Many examples are found in the cathedrals of Paris, Rheims and Amiens.



ROSE WINDOW

ROSE'WOOD, the name of several varieties of a beautiful wood used in making ornamental furniture and musical instruments. Rosewood is prized for the high polish it attains, and for

its rich color, which varies from red-brown to purple or almost black. The black varieties are often beautifully streaked with red. When the wood is cut or sawed, a slight odor of roses is perceptible, which accounts for the name. The heartwood grows to great dimensions and is always faulty, as decay begins before the tree matures. For this reason, squared planks or logs are not seen; the wood is imported in slabs from ten to twenty feet long, and from five to twelve inches wide in the heaviest part. On account of its irregular form the wood is sold by weight, the price depending upon the richness of the color, and varying from $50 to $90 per ton; unusual specimens are sold for $450 per ton. Rosewood is employed solid and as veneer. It comes principally from Jamaica, Brazil, Honduras, East India and Africa; a choice quality is the product of the *Dalbergia* tree, found in Malabar, India.

ROSIN, *rahz'in,* the resin of pitch pine, which may exude from wounds in the tree, but which is obtained for commercial purposes by distilling turpentine, the rosin remaining in the tank after the turpentine has passed over. Rosin is a brownish-yellow solid resembling a gum in structure and having an odor like that of varnish. It is most extensively employed in the manufacture of varnish and is also used for hardening laundry soap, in soldering, in the manufacture of sealing wax and in making some kinds of plaster and cement. See Resins; Turpentine.

ROSS, Alexander (1783-1856), a Canadian pioneer, whose books about early days in the Northwest constitute a valuable part of Canadian history. The most important of these are *Adventures of the First Settlers on the Oregon or Columbia River; The Fur Hunters of the Far West,* and *The Red River Settlement,* the last being written in the year of his death. Ross had an eventful career. He was born in Scotland, but emigrated to Canada when he was eighteen. He taught school for some time in Glengarry, Upper Canada, went to Oregon with John Jacob Astor's expedition in 1810, and then for more than a decade was in the employ of the Hudson's Bay Company. About 1825 he settled in the Red River district, where he had a large share in developing the section.

ROSS, Betsy (1752-1836), an obscure seamstress of Philadelphia who gained an honored place in the history of the United States as the maker of its first national flag. She was living in a small, old-fashioned brick house, at 239 Arch Street, when, in June, 1777, she was visited by a committee from Congress, headed by General Washington; the committee had heard that she was an expert needlewoman, and it desired her to make a flag according to the design adopted by Congress on June 14 (see Flag, subtitle *United States Flag*). The story has come down that Washington preferred six-pointed stars, and that she persuaded him to allow her to make five-pointed ones. The flag made by her (shown on page 2195) had thirteen white stars arranged in a circle on a blue field, and thirteen alternate red and white stripes. Her work was so satisfactory that the government made a contract with her to provide all of its flags, and the business was continued by a daughter for over twenty years after the death of Mrs. Ross. The old house on Arch Street (pictured on 4622) has been made a permanent memorial by the Betsy Ross Memorial Association.

"The simple stone of Betsy Ross
Is covered now with mold and moss,
But still her deathless banner flies,
And keeps the color of the skies.
A nation thrills, a nation bleeds,
A nation follows where it leads."

Betsy Ross was the daughter of Samuel Griscom, a Quaker shipbuilder and carpenter who helped build Independence Hall. Her husband, John Ross, was the nephew of one of the signers of the Declaration of Independence.

ROSS, Sir George William (1841-1914), a Canadian educator and statesman, for many years a teacher and public school inspector, later in turn a member of the Dominion House of Commons, minister of education for Ontario for sixteen years and premier of that province. As minister of education he secured the passage of the law federating the University of Toronto, and as premier he was instrumental in securing the construction of the Timiskaming & Northern Ontario Railway, which opened to settlement a rich, new region. Sir George was a man of more varied gifts and activities than perhaps any other Parliamentary leader of his time.

Sir George was born near Nairn, Ont. He attended the Toronto Normal School, and for many years was a teacher in the public schools. From 1872 to 1883 he sat as a Liberal in the House of Commons. He was then Ontario minister of education until 1899, and premier of the province for six years more. In middle life, after he was already a national figure, he studied law, and was called to the bar in 1887. In 1907 he was called to the Dominion Senate, in which he became the Liberal leader. Espe-

cially in his later years Sir George won a wide reputation as a lecturer, particularly in favor of temperance reform and prohibition. He also found time to write several books, including the *Life and Times of Alexander Mackenzie; The Universities of Canada; The School System of Ontario; The Senate of Canada,* and a volume of reminiscences, *Getting into Parliament and After.*

ROSS, Sir James Clark (1800-1862), an English explorer, born in London. In 1818, and again in 1829-1833, he accompanied his uncle, Sir John Ross, on expeditions in search of the Northwest Passage, and on the second of these excursions distinguished himself by discovering the location of the north magnetic pole. In the interval between these two voyages with his uncle he made four Arctic expeditions under Parry. His most noteworthy service to science, however, was his expedition, in 1839, with the *Erebus* and *Terror,* to the Antarctic seas. He discovered a great body of land which he named Victoria Land, several islands, and an active volcano which he called Erebus. The latitude reached by him, 78° 10′ S., established a record which was not broken until 1900. On his return Ross was knighted. In 1848 he headed an unsuccessful expedition in search of Sir John Franklin, and in 1856 became a rear-admiral. An account of his Antarctic journey is contained in *A Narrative of a Voyage in Antarctic Regions.*

For comparison of his voyages in Antarctic regions with others which followed, see Amundsen, Roald; Scott, Robert F.; Shackleton, Ernest. See, also, Polar Exploration.

ROSSETTI, *ro set′i,* Christina Georgina (1830-1894), an English poet, the sister of Dante Gabriel Rossetti (see below). She was born in London, educated in her home with her brothers and sisters, and lived a quiet, retiring life. Her interests were two—religion and poetry; and naturally all her writings show clearly her religious, mystic tendency. They are, however, almost as noteworthy for the delight which they reveal in the simple physical beauty of the world. Critics agree in ranking Christina Rossetti next to Mrs. Browning among English women writers of the nineteenth century, and some of her short lyrics stand among the best things ever produced in English. *Goblin Market and Other Poems, The Prince's Progress and Other Poems* and *A Pageant and Other Poems* contain the most of her work. *Up Hill* is probably the best known and best loved of her poems.

ROSSETTI, Dante Gabriel (1828-1882), an English poet and painter, one of the prominent leaders in a movement to bring back to painting the purity and simplicity which had characterized it in the Middle Ages. He and his companions in this movement organized the Pre-Raphaelite Brotherhood in 1848, and founded a periodical called *The Germ* for the exposition of their views (see Pre-Raphaelites). In this paper was published one of Rossetti's earliest and loveliest poems, *The Blessed Damozel,* whose opening lines suggest the idealism and spirituality of all the Pre-Raphaelite art and literature:

> The blessed damozel leaned out
> From the gold bar of Heaven;
> Her eyes were deeper than the depth
> Of waters stilled at even;
> She had three lilies in her hand,
> And the stars in her hair were seven.

Rossetti was the eldest son of an Italian painter and writer who was exiled for taking part in the revolution of 1820. Dante Gabriel was born in London, where his father settled in 1824. The boy grew up under literary and artistic influences, and was well educated, studying at King's College School and at the Royal Academy of Art. The influence of Ford Madox Brown, who became his art teacher when Rossetti was twenty, was also far-reaching. Rossetti was married in 1860 to a beautiful girl who furnished the inspiration for the best of his paintings and of his poetry, and when she died, two years after their marriage, his grief was so intense that he placed in her coffin all of his writings then unpublished. In 1870, yielding to the demands of his friends, he permitted them to be exhumed and published. This collection, a volume of *Ballads and Sonnets* (1881) and a series of translations of early Italian poets (1874) constitute his entire poetical output. Of his sonnets, the most notable are found in a series entitled *The House of Life,* a collection of beautiful love poems of which his wife was the inspiration. He also wrote *Hand and Soul,* a delicately imaginative story in prose.

Rossetti's paintings are remarkable chiefly for their spiritual quality and mysticism. He found his themes in Biblical subjects, in the life and work of Dante, and in his own imagination. These themes are represented by *Girlhood of Mary Virgin; Dante's Dream* and *Beata Beatrix;* and *The Blessed Damozel* and *Fiammetta.* Just as his paintings express the idealism that characterizes his poetry, so his

poems have a beauty of language that is best described as word painting. In both forms of his art he expressed unreservedly his individuality.

Consult Cary's *The Rossettis;* essays by Walter Pater in *Ward's English Poets.*

ROSSINI, *roh se'ne,* GIOACHINO ANTONIO (1792-1868), an Italian composer, was born at Pesaro. His mother was the daughter of the town baker and his father was the town trumpeter, who played with strolling musicians in summer and thus made enough money to keep the family during the winter. At the age of ten Rossini played a horn with these rough wanderers, and the lawless life he led showed its impression later in his personal conduct as well as in his operas. When he was twelve years old he went to Bologna to study music, and two years later could sing at sight any composition placed before him. He was compelled by his teachers to study counterpoint, a subject which he detested, and as soon as he had learned enough of it to compose operas he refused further musical training and ended his days as a student. In after years his operas revealed his ignorance of many points in composition, but as he was a man of much vanity he never seemed to realize his weaknesses.

When he was eighteen years old he wrote his first opera, *Demetrio,* but it was in his twentieth year that he began to show marvelous inventive powers. In that one year of 1812 he composed five operas, one of which was *Tancredi,* a story of the Crusades, which was a remarkable success. In 1816 and 1817 Rossini had a contract to write two operas each year for a theater at Milan, and during that period produced such highly popular compositions as *The Barber of Seville* and *Otello.* During the next five years he wrote with great rapidity such operas as *Moses in Egypt, Ermione* and *The Lady of the Lake,* the latter based on Scott's famous poem. These successful works all appeared before Rossini's thirtieth birthday. In 1822 he married a very wealthy woman, and soon went to Vienna to direct the production of his *Zelmira.* Beethoven, then living in Vienna, was, for the time being, practically forgotten in the enthusiasm for the new composer.

Rossini's popularity, however, began suddenly to wane. His indolence prevented him from inventing new themes; he was constantly patching together bits of old airs to make new ones; his unrestrained habits shocked many people; his vanity and praise of himself disgusted others. Having squandered his wife's fortune, he plunged into debt, and then took the pains to write a really excellent opera, *Semiramide.* But the Italian people received it coldly, and Rossini, in disgust, went to England. There his operas were a failure, but he used his fame so shrewdly in giving lessons that he cleared $50,000 in five months. He then proceeded to Paris, where by skilful advertising he had himself appointed director of the Italian opera and procured from the government an annual pension of $4,000. He became too indolent to write anything new and again patched parts of his former works together until the Italian Opera House was ruined financially. An attempt to stop his pension caused him to bring suit against the government to retain it, and during the six years of the trial he lived in a garret reached only by a frail ladder. This was to make the public believe him in poverty; but it deceived nobody, for it was well known that he owned at Bologna a palace in which the silverware alone was valued at $100,000. He won his suit and in 1836 returned to Italy, where, rich but miserable, he spent his last days. R.D.M.

Consult Bevan's *Rossini;* Edwards' *The Life of Rossini.*

ROSS'LAND, a mining community in the West Kootenay district, British Columbia. It is six miles north of the United States boundary and fifty-five miles by rail southwest of Nelson, B. C. It is served by branches of the Canadian Pacific and Great Northern railways. Rossland is the center of the gold-copper mining district, and when this section was first opened it grew rapidly. The city was incorporated in 1897, and in 1901 had a population of over 6,000. After the boom was over the population slowly declined, but the mines are still producing and the city is still prosperous. Population in 1911, 2,826; in 1921, 2,097.

ROSTAND, *rohs tahN',* EDMOND (1869-1918), a French writer of plays and poetry, and the son of a prominent journalist, was born in Marseilles. Rostand's first play, a comedy in verse, was produced in Paris in 1894, and was immensely successful. Both this and his later plays proved him a skilful dramatist, a satirist and a poet. Three other plays followed in quick succession, and then came his greatest success, *Cyrano de Bergerac,* a "heroic comedy" in verse, which was produced by the famous French comedian, Coquelin, who also played the leading part. The play was quickly translated into English, German, Russian and other

European languages, and was produced in several continental cities.

In 1900 *Cyrano* and *L'Aiglon,* another of Rostand's plays, were presented in America by Sarah Bernhardt and Coquelin. Richard Mansfield produced *Cyrano* in English in the United States and Canada. A Chicago business man named Gross filed suit against Rostand, claiming that Rostand's play was a plagiarism of his own comedy, *The Merchant Prince of Cornville.* Gross won the suit, and *Cyrano de Bergerac* had to be withdrawn. Rostand has written several other plays. His most conspicuous success after *Cyrano* was *Chantecler,* a fantasy of bird and animal life which was awaited with great interest and hailed with enthusiasm both in France and in America, where Maude Adams appeared as "Chantecler." Rostand was elected to the French Academy in 1902.

ROS'THERN, a town in the central part of Saskatchewan, and on the Canadian Northern Railway about midway between Prince Albert and Saskatoon. It is forty miles north of Saskatoon and forty-seven miles south of Prince Albert. Rosthern is situated in one of the richest wheat-growing areas in the world, a district made famous by Seager Wheeler, the world's champion wheat grower, who lives four miles from the town. Rosthern's five elevators are among the largest west of Winnipeg. Flour milling is the only important industry. Rosthern was settled in 1896, and was incorporated in 1906. The attractive town hall, built at a cost of $30,000, was completed in 1909. Nearly half of the residents of Rosthern are of German birth or descent. Population in 1911, 1,172; in 1921, 1,074.

ROSTOCK, *rohs'tohk,* one of the busiest German ports on the Baltic, and the largest town of Mecklenburg-Schwerin, is situated on the Warnow River, about eight miles from the sea. No other Baltic port possesses so large a merchant fleet. Although the city has a medieval appearance, its busy fairs for the exchange of wool, horses and cattle are thoroughly modern in spirit. The industries are varied, the most important being shipbuilding, the making of machinery and chemicals, brewing and distilling. Rostock is the seat of the supreme court of both the duchies of Mecklenburg, and is well supplied with schools, hospitals and other institutions. Among the most interesting of its buildings are Saint Mary's, one of the finest Gothic churches of Northern Germany, the ducal palace, the Gothic town hall, with its many turrets, and the new university building. A statue of Blücher, who was born here, adorns one of the city's many fine squares. The university was founded in 1418 and rebuilt in 1867. It has a library of 140,000 volumes, an observatory, and an experimental agricultural colony. Population of the city in October, 1919, 67,953.

ROSWELL, *rahz'wel,* N. M., the center of one of the largest cattle and sheep-raising sections of the United States, and the county seat of Chaves County, is situated in the southeastern section of the state and on the Pecos River. Amarillo, Tex., is 212 miles northeast by rail, and El Paso is 230 miles directly southwest. Transportation is provided by the Atchison, Topeka & Santa Fe Railroad, constructed to this point in 1900. The most important industry of the place is the raising of cattle, sheep, alfalfa and apples. The county courthouse, constructed at a cost of $161,000, the $115,000 Federal building, the New Mexico Military Institute, Saint Mary's Hospital, the Carnegie Library and a high school are features of interest in the city. Although the place was settled in 1877, it did not become a city until 1903. In 1920 the population was 7,062, about five per cent of the inhabitants being Mexicans and negroes.

ROTATION, *ro ta'shun,* **OF CROPS.** Agriculturists have found that raising the same crop on a field, year after year, deprives the soil of its fertility, no matter how deep and rich the soil may be. An experiment conducted by the Illinois Agricultural Experiment Station affords a striking illustration of this fact. A record of the crops grown during a period of twenty years shows the following results: One plot was kept in corn for the entire period; on another, corn and oats were grown in rotation; on the third, clover was added to corn and oats. On the first plot, the yield at the end of the period was twenty-nine bushels to the acre; on the second, forty-eight bushels, and on the third, eighty bushels. At the experiment station of Tennessee it was shown that, under a proper system of farming, the productivity of the soil was increased from twenty to eighty bushels an acre.

All fertile soil contains available plant foods —nitrogen, potash and phosphorus—in varying proportions, and also a sufficient amount of water to dissolve these foods and supply them to the plants as fast as they are needed. One plant requires a larger proportion of some of these foods than another, and if that plant is

grown upon the land year after year the supply of this food becomes exhausted to such a degree that the plant is not sufficiently nourished to produce a good yield. Again, all plants drain the soil of its nitrogen, and unless means for restoring nitrogen are employed the soil soon becomes infertile. The best method of restoring nitrogen is to plant clover, cowpea, soy bean or some other leguminous plant, and to plow the crop under. This is called *green manuring*. By a diversified system of farming different crops follow each other in a regular order, and no one element of plant food is drawn on more extensively than another. The fertility of the soil is maintained and the farmer receives greater returns for his labor.

Another reason for the rotation of crops is that the continuous growing of one sort of grain or other crop contributes to the growth of weeds, insect pests and plant diseases. Small grains should be followed by tillage crops, such as corn or potatoes, so that weeds may be killed. If the field becomes infested with the Hessian fly, for instance, raising corn, then potatoes and then clover will rid the field of the pest. A third reason for rotation of crops is that a variety of crops assures the farmer of a better income for a period of years. No system of rotation will apply to all localities, but the following is suggestive:

First and second years, corn, planted on ground enriched by a green manure crop previous to the planting of the first crop.

Third year, a small grain. In the wheat belt two successive crops of wheat might take the place of the two crops of corn.

Fourth year, timothy and clover. At the end of this year the sod may be turned over and the system of rotation begun again. Some farmers, however, prefer to keep the field in timothy and clover for two or more seasons. See FERTILIZER; SOIL. W.F.R.

Consult Parker's *Field Management and Crop Rotation.*

ROTH'AMSTED, the oldest and most purely scientific agricultural experiment station in the world, was established in 1843 by Sir John Bennett Lawes, Bart., F.R.S., on his ancestral estate adjoining the village of Harpenden in Hertfordshire, England. Since 1889 it has been in the hands of a trust created by its founder, with an original endowment of nearly half a million dollars for its maintenance on the original plan. It is divided into "fields," of which Broadbalk (sown continuously to wheat, without fertilization), Agdell (with rotation of crops) and Hoos (since 1848 devoted to roots of leguminous plants) are among the most famous. The park grass plots began in 1856. Careful records are kept, and samples of each year's harvest are preserved. The work is not commercialized in any way, but is wholly scientific; and while the annual report is awaited with interest by agriculturists and others throughout the world, there are no issues of bulletins of advice to farmers. A. D. Hall, F.R.S., in charge of the institution, said, in 1912:

It is impossible to exaggerate the importance of continuing the experimental plots at Rothamsted without any change, as nowhere else in the world do such data exist for studying the effects of season and manuring upon the yield and quality of the crop, and for watching the progressive changes which are going on in the soil.

ROTHS'CHILD (in German, *roht'shilt*), a famous family of European bankers, financiers and philanthropists. The name was first connected with great financial deals when Mayer Anselm Rothschild, the son of a Jewish merchant of Frankfort-on-the-Main, opened a money-exchange house in that city, and in 1806 won favor throughout Germany and Austria by caring for the fortune of the Elector of Hesse-Cassel, who had fled from the invading French. Immense sums of the wealth of royalty were henceforward intrusted to him, and before his death in 1812 he and his five sons had amassed huge fortunes. So conspicuous was the service of these sons that the Emperor of Austria made each a baron in 1822.

BARON LIONEL ROTHSCHILD

The business at Frankfort passed to the eldest son, Mayer Anselm, and then to the sons of Karl, but upon the death of the youngest of these sons the Frankfort house was closed. Solomon, the second son of the founder of the firm, established the famous house at Vienna, which repeatedly has come to the financial rescue of European nations. His brother Nathan established the British firm at Manchester in 1798, and removed it to London in 1803. Jacob, the fourth son, was founder of the famous Paris house, and Karl, the youngest, of the one at Naples. The enterprises are yet conducted by descendants of the founders.

The power of these establishments has been stupendous. They have financed wars and have frequently prevented wars by refusing loans; they have aided in the establishment of national educational systems, such as those of Germany and France; their assistance in European industrial development can scarcely be estimated. Lionel Rothschild, son of Nathan of London, was the main influence leading to Jewish emancipation in Great Britain. Elected five times to Parliament, he refused each time in taking the oath to repeat the words, "on the true faith of a Christian," and this aroused such a discussion that in 1858 the rule requiring the phrase was abolished.

Consult Balla's *Romance of the Rothschilds;* Reeve's *The Rothschilds.*

ROTTEN BOROUGHS, *rot''n bur'ohz,* the name applied to certain electoral districts represented in the British Parliament before the passage of the Reform Bill of 1832. These were but sparsely populated or had no populations at all. For several centuries the parliamentary districts had not been rearranged. In the meantime the population had shifted, great industrial towns had arisen and older towns had decayed. Manchester and Birmingham, each with over 100,000 citizens, had no voice in the national government, while in some districts the landowners were able to go to Parliament without even the formality of an election. It required nearly a century of agitation to abolish the rotten boroughs.

ROTTERDAM, *rot'er dam,* the chief commercial port of Holland and, next to The Hague, its largest city, is situated on both sides of the River Meuse, nineteen miles from its mouth and sixteen miles southeast of The Hague. In addition to having an extensive ocean traffic with countries over the seas, Rotterdam is an important port for vessels bound to and from the Rhine provinces of Prussia, for the Meuse is the great highway from the open sea to the Rhine and the interior of Europe. New canals, wharves, quays and docks have been built, and every possible improvement has been made to render the waterway service excellent. Large ships are now able to reach the sea two hours after leaving Rotterdam.

The city is divided into two parts by High Street. The old quarter is a collection of quaint, wooden buildings, while the newer section contains wide, well-kept streets, lined with substantial buildings constructed for service rather than great beauty. The Saint Lawrence Church, built in the fifteenth century, has a large organ and many marble monuments in honor of the city's distinguished men; Erasmus, the scholar, who was born here, is honored by a fine bronze statue on the open market place, and his home is a feature of great interest. The Boyman's Museum contains a notable collection of paintings by Dutch masters. Other buildings of prominence are the exchange, the town hall, the courthouse and the post office. The zoological and botanical garden and a beautiful park are also features of the city. Some of the largest docks are on the south side of the river, where also are located the busy ironworks and shipbuilding yards. In addition to their shipping activities, the thrifty people of Rotterdam carry on an extensive trade in butter, cheese, linen and flax, and in articles of gold and silver. Population in 1921, on January 1, 510,538.

ROUBAIX, *roo beh',* a manufacturing town and trading center in the north of France, situated in the department of Nord, about eight miles northeast of Lille. In 1914, during the invasion of the Germans, Roubaix, with many other towns and villages, was captured and placed under martial law (see WAR OF THE NATIONS). Almost all of its people and those in the immediate vicinity were employed in the various factories, where cloth for men's garments, shawls, stuffs for furniture and ladies' dresses, velvet, wool, cotton and silk—products having an annual value of $80,000,000—were made. The National School of Industrial Arts is located here. Population in 1921, 113,265.

ROUEN, *roo ahN',* a leading manufacturing city of France, and capital of the department of Seine-Inférieure, situated on the Seine River, eighty-seven miles northwest of Paris. Although its old ramparts have been converted into broad boulevards, and the newer quarters are regularly built and contain fine modern dwellings, Rouen still retains much of its medieval atmosphere in its crooked but picturesque streets and many old houses with their quaint gables and carved timbers. The old Cathedral of Notre Dame is a noble piece of ancient Gothic architecture; the Church of Saint Ouen, which surpasses the cathedral both in size and beauty, is one of the finest of the city's medieval structures. Other places of interest are the Church of Saint Patricia, with its gorgeous colored windows; the Tower of Joan of Arc, where this soldier-heroine was imprisoned; the palace of justice, where the assizes are still held, and the Hotel de Ville, containing the public library.

Rouen's commercial importance is due chiefly to its extensive manufacture of checked and striped cottons. Hosiery, mixed silk and woolen goods, shot, chemicals and refined petroleum are other products of manufacture. The history of Rouen has been eventful since the days of the Northmen, who made it their capital (see NORMANDY; NORMANS). In 1204 it was taken by siege by the French king, Philip Augustus, and annexed to France. During the wars of Henry V and Henry VI of England the city was under English control from 1419 to 1449; in the latter year it was retaken by the French under Charles VII. In 1431 Joan of Arc was burned at the stake in a public square, which now contains a statue of the heroine. Population in 1921, 123,712.

ROUGE, *roozh,* the French word for *red,* is the general name for cosmetics used to color the skin. Safflower, citric acid and French chalk enter largely into the manufacture of a rouge in general favor. Authorities agree that the ultimate effects of the use of coloring matters are harmful, as they clog the pores of the skin and the drugs contained in the preparations are absorbed by the system. A preparation made from crystals of sulphate of iron, called rouge, is used by jewelers for polishing purposes.

ROUGE-ET-NOIR, *roo zha nwahr',* the French for *red and black,* is the name of a game of chance much in vogue in Europe, especially in the gambling rooms of Monte Carlo. It is played with the cards of six complete decks. The players arrange themselves about a green-covered table, on which is a diagram showing four divisions upon which money may be placed as a bet. These are *rouge, noir, couleur* and *inverse.* The banker, or dealer, deals a row of cards (face up) for noir until the spots number between 30 and 40, face cards counting 10 and aces 1. Then a similar row is dealt for rouge. The row which most nearly approaches the number 31 is the winning one, and the players who have staked on the winning color get double stakes. If the first card turned up in the deal is of the winning color couleur wins, and if the contrary is true inverse wins. A fresh deal is made when the number of spots is the same in each row; that is, in case of a *refait,* or tie. If both count exactly 31 the banker claims one-half of all stakes, a rule which gives him an advantage calculated to be equal to about 1.25 per cent on all sums staked. Each player shuffles a part of the cards before the game starts, and the banker then shuffles them all. The game is also called trente-et-quarante (thirty and forty).

Consult Foster's *Complete Hoyle.*

ROUGH RIDERS, the name popularly given to the First Regiment of the United States Volunteer Cavalry, which, during the Spanish-American War, served in Cuba under Leonard Wood and Theodore Roosevelt. Before that time the name had been familiar in connection with Buffalo Bill's "Wild West Show and Congress of the Rough Riders of the World," and was applied to the volunteer cavalry regiment because that body was made up largely of cowboys and Western hunters. Roosevelt, promoted to the rank of colonel, led his Rough Riders in the charge up San Juan Hill on July 1, 1898. When the regiment was mustered out its members formed the patriotic society known as the Rough Riders' Association, which has as its object the perpetuation of memories of the war. It has also an insurance fund for the relief of needy members. All members of the regiment are eligible, and the right to belong descends to the oldest son. See ROOSEVELT, THEODORE.

ROULETTE, *roo let',* a gambling game of French origin, played first in the famous gaming rooms of Monte Carlo, and from there spread throughout the world. It is not in any way a game of skill, and though "systems" to beat the game have been invented and tried in great numbers, none has evolved any reliable or successful plan. It is purely a game of chance, with any possible advantage on the side of the bank.

The roulette table is covered with green cloth, with a wheel in the center. The cloth is divided into spaces marked *passe, pair, manque, impair* and two diamond-shaped spaces colored black and red. The wheel is divided into 37 compartments, numbered from 1 to 36 and one with 0. *Pair* indicates even numbers; *impair* odd numbers; *manque* indicates the numbers from 1 to 18 inclusive; *passe,* the numbers from 19 to 36.

As played at Monte Carlo the minimum stake is five francs, but elsewhere stakes can be arranged to suit the players. There are innumerable ways of staking: on color, odd or even numbers, on single numbers, on groups, and many others. At Monte Carlo the *croupier,* whose duty it is to set the wheel revolving and literally rake in the money lost to the bank, calls out "Faites votre jeu," meaning *play,* starts the wheel revolving and throws in

the marble. Stakes are then placed. When the wheel begins to stop and it is seen that the marble or ball will soon fall into a number he calls "Rien ne va plus," after which no more stakes can be placed. The croupier announces the number, the color, whether odd or even or manque or passe, and pays the winners, and with his miniature rake gathers in the money lost by bettors. Then the game begins over again, with the cry, "Faites votre jeu."

ROUMANIA, *ru ma' ni a,* the former spelling of the word RUMANIA (which see).

ROUND'ERS, an old English game now little played, from which modern baseball was derived. It can be played by two sides, or teams, of any number of players. A bat and a ball are used, but the bat is smaller than the baseball bat, and the ball is soft, in order not to injure players at whom it is thrown. An ordinary tennis ball may be used. The rules are not very definite, and there is no science in the game. The bases or goals are four, similarly placed to those in baseball, but not so far apart; the distance is optional, and depends on the players. The fielders take their places apparently without much arrangement or thought, and the batsman stands ready to hit the ball, which is thrown gently to him; he endeavors to hit it so far that he may make a *round,* or home run, from which fact the game derives its name.

A batter is out if he misses the ball three times; if, while running, the ball thrown by an opposing player hits him; if when he hits the ball a fielder catches it on the first bounce from the ground. If the ball is caught by a player, on the fly, it is an inning, or "all out," and the other side earns the right to bat.

ROUND'HEADS, the name which was first applied in derision to the members of the Cromwell faction, or Parliamentary party, in England at the outbreak of the Civil War in 1642, because they insisted on having their hair cut close to their heads. Their opponents, the Cavaliers, or Royalists, followers of King Charles I, wore long, flowing curls. The Roundheads developed into the great political parties later known as Whigs and Liberals, as opposed to the Cavaliers, Tories and Conservatives. See COMMONWEALTH OF ENGLAND.

ROUND TABLE, in the legends of King Arthur, a famous table made by the wizard Merlin, about which the knights of Arthur took their seats, and from which they were named. One seat, the Siege Perilous, was reserved for the man who should be worthy to seek and find the Holy Grail, and was finally awarded to Galahad. The Knights of the Round Table had a large part in the literature of medieval chivalry, and many modern writers have made them the subjects of prose and of

KING ARTHUR'S ROUND TABLE

Preserved in the castle at Winchester, England. This is the table at which sat—

"that fair Order of the Table Round,
A glorious company, the flower of men,
To serve as models for the mighty world,
And be the fair beginning of a time."

Arthur had it made round that it might have neither head nor foot, and that he might sit among his knights a man among equals. The painting, in soft rose and green shades, from which the above drawing was made, was painted in the days of one of the early kings of England.

verse tales. Of these the most famous are Tennyson's *Idylls of the King.* In the *Idylls* is told the story of the Round Table from the days of its founding, when—

> Arthur and his knighthood for a space
> Were all one will,

to those unhappy days when Bedivere, "first made and latest left of all the knights," cried out that—

> Now the whole Round Table is dissolved,
> Which was an image of the mighty world.

Consult Brooks' *Story of King Arthur and the Knights of the Round Table;* Frost's *Knights of the Round Table.*

ROUND TOWERS, an interesting form of medieval Christian architecture. These towers are tall stone structures, tapering from a circular base to a cone-shaped roof. They are divided into stories with wooden or stone floors, and ladders serve as staircases. In most cases there is one small window for each story and four windows just below the roof. Ireland has

a number of these towers, and a few are to be found in Scotland and other European countries. It is supposed that they were used as places of refuge in times of danger, and they may have served as bell towers.

ROUND TOWERS

(1) Round church tower at Little Saxham, Scotland; (2) round tower on Devenish Island, Ireland.

ROUSSEAU, *roo so',* JEAN JACQUES (1712-1778), the man of whom Napoleon said, "Without him the French Revolution would not have occurred." It was the special work of Rousseau to preach democratic ideals and the equality of man, and the great upheaval in French social conditions little more than a decade after his death was in part the result of the spread of these doctrines. Rousseau was born of Huguenot parents in Geneva, Switzerland. His mother died when he was so young that he retained no recollection of her, and his education was fragmentary and of little value. When a mere lad he was apprenticed to an engraver, but at the age of sixteen he ran away and went to the Duchy of Savoy, where he made the acquaintance of Madame de Warens, a lady of culture, wealth and refinement. For the next ten years Rousseau spent most of his time in the home of Madame de Warens, where he came in contact with some of the most brilliant intellects of Europe.

JEAN JACQUES ROUSSEAU

The son of a watchmaker who became one of the most powerful factors in history.

In 1741 Rousseau went to Paris, where his introduction of a new method of writing music before the Royal Academy of Sciences gained him admission to the houses of the most intellectual families of the city. He became secretary to the French minister at Venice, but the condescending attitude of his employer so wrought upon Rousseau's sensitive nature that he gave up his position and returned to Paris, where he attempted to bring suit against the minister. He soon learned, however, that a common man could not obtain redress from the aristocracy.

This was the turning point in Rousseau's career. He now began to give attention to the philosophy of government and to social conditions, and during the next fifteen years he produced a series of works which revolutionized the thought of Europe. They included *Discourse on Inequality; Julie, or the New Heloise; The Social Contract,* and *Emile,* the last an epoch-making work on education.

Rousseau was a man of marked contrasts, a character "in whom probably beyond all others, is to be found the greatest mixture of strength and weakness, of truth and falsity, of that which is attractive and that which is detestable." He possessed the highest ideals and a remarkable power of embodying them in action. In an age boastful of its intellectual brilliancy and dominated by artificial life he sounded the call "Back to Nature" with such force that his cry was heard and heeded. *Emile* was one of the great books in the field of education, and many of the principles set forth in it were adopted by Pestalozzi and Froebel. The story of Rousseau's life is told in his *Confessions,* a remarkable work in twelve volumes.

E.D.F.

Consult Boyd's *Educational Theory of Jean Jacques Rousseau;* Davidson's *Rousseau and Education According to Nature.*

ROWELL, *rou'el,* NEWTON WESLEY (1867-), a Canadian barrister and statesman, long one of the leaders of the legal profession in Ontario, and since the chief of the Liberal party in the province. Rowell was born in Middlesex County, Ontario. After studying law he was called to the bar in 1891, and for twenty years practiced with increasing success. His eminence at the bar, added to his ability as a speaker, brought him into political affairs, and in 1911 he was asked to lead the Ontario Liberals, who were in need of a strong

personality to offset the effect of Sir James Whitney's efficient administration of the government. Under Rowell's vigorous direction the Liberal party acquired new strength. In the provincial elections of 1914 the Liberals made a determined but unsuccessful effort to abolish barrooms in Ontario. During the progress of the War of the Nations Rowell lent valuable aid to the government by many public addresses and by a patriotic policy in the Ontario assembly. In 1917, on the resignation of the Hearst ministry, Rowell was called to the premiership of the province.

ROWING, *ro'ing,* the act of driving a boat forward along the surface of water by means of oars. Boats so propelled, with a rudder for steering, were used earlier than 3,000 years before Christ. The ancient Greeks and Romans traveled in great galleys with rows of oars one above the other, manned by slaves who were chained to their places. In Britain the Saxons were famous oarsmen, and so were the invading Danes and Norwegians. It is recorded that Edward the Peaceable, one of the kings of England during the tenth century, "was rowed in state on the River Dee by eight tributary kings, himself acting as coxswain."

In 1715, modern boat racing had its beginning. An English comedian, Thomas Doggett, instituted a contest which is still an annual affair, by offering a prize of a waterman's coat with a great silver badge on the sleeve to the winner of the race. Amateur rowing as it is known to-day began on the Thames River, in England, about the year 1800, with informal races between six- and eight-oared boats, whose owners constituted a club. Two of these clubs, the *Star* and the *Arrow,* combined in 1818 to form the *Leander,* which is still the most famous rowing club in the world. The first race between Oxford and Cambridge universities took place in 1829, and ever since 1856 this race has been an annual event. England's most important amateur regatta is held every year at Henley, on the Thames.

Australia holds an annual regatta which is called the Australian Henley, and all of the European nations have amateur rowing associations similar to those of England. Canadian rowing has made great progress. In 1904, a Canadian, rowing alone, won the *Diamond Sculls* at Henley. Harvard and Yale universities have led in this sport in the United States since 1843-1844, when they first took it up, but the first amateur club was founded ten years earlier. The chief regatta is held on different courses in different years by the National Association of Amateur Oarsmen, founded in 1873. American rowing crews have competed bravely with the English both in the United States and abroad, but the English have almost always won.

The light boats used in racing are called *shells.* They are built for two, four, six and eight oarsmen and are known as *pairs, fours, sixes* and *eights.* In England the single rower, using two oars, is called a *sculler,* and the oars are called *sculls. Double scullers* are common in the United States but not in England. English shells and many of those constructed in the United States are built with sliding seats. The sliding seat is undoubtedly more exhausting than the fixed seat, but it may account for the Englishmen's supremacy in this sport. See CANOE AND CANOEING. A.C.

Consult Crowther and Ruhl's *Rowing and Track Athletics;* Woodgate's *Rowing.*

ROYAL GORGE, *gawrj,* one of the most famous canyons in North America, a portion

A VIEW OF THE ROYAL GORGE

of the valley of the Arkansas River. Like the Grand Canyon of the Colorado, the Royal Gorge is a magnificent example of river erosion (see EROSION). It is between eight and nine

miles long and is located in Fremont County in Central Colorado. The steep sides of the canyon rise on either side to a height of 3,000 feet, and in the bed the river flows tumultuously over rapids. One of the most remarkable features of the gorge is the wonderful variety of rock colors.

ROYAL INSTITUTION OF GREAT BRITAIN, an organization founded in London by Count Rumford in 1799, "for the promotion, diffusion and extension of science and useful knowledge." The original plan was to spread information on physics and mechanics among the laboring classes by means of public lectures, but the lecturers secured for this purpose gave the organization such fame that all classes of students were attracted and large laboratories had to be erected. Such men as Faraday, Tyndall and Gladstone were among its instructors, and many of the most valuable discoveries in physics and chemistry, especially in light and heat, were made in its laboratories. The work has always been done in the most simple and popular manner possible, and the lectures are always extremely practical and up-to-date.

There is a splendid library of about 70,000 volumes on scientific subjects, while the equipment for physical and chemical experiments is one of the most valuable in Great Britain. The Institution has received numerous bequests and is thus able to assist young scientists in their researches. All members of the society are elected by ballot; they maintain the school and experiments by means of an admission fee and annual subscription.

ROYAL NORTHWEST MOUNTED POLICE, popularly known throughout Canada as the "mounties," is the police force of the Northwest. The jurisdiction of the mounted police covers all of the territory which has ever been a part of the North West Territories, including the provinces of Alberta, Saskatchewan and Manitoba.

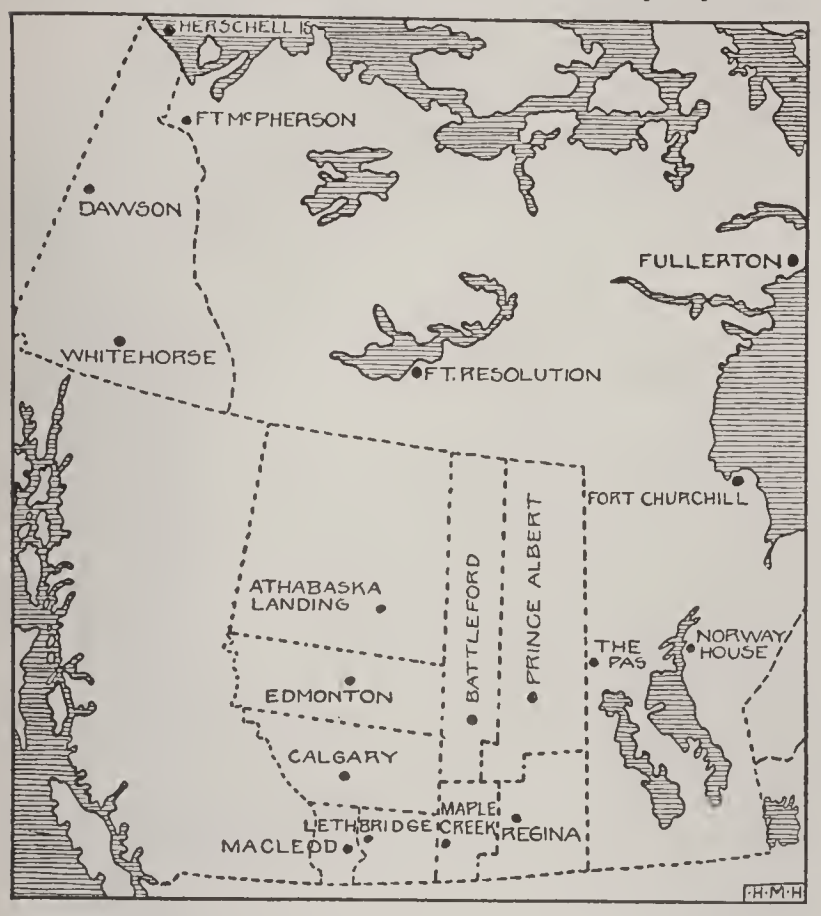
Its Beginnings. After the Dominion government in 1870 acquired formal control of the Canadian Northwest, it faced the new problem of governing a territory extending approximately 900 miles from east to west, and somewhat more from north to south. The Red River Rebellion and minor disturbances in the Northwest showed the need of some control over the section if it was ever to be open to permanent settlers. To Sir John A. Macdonald belongs much of the credit for the idea of a mounted police force and for its successful adoption, although the force was actually organized during Alexander Mackenzie's Ministry.

The Act of Parliament establishing the force provided that all the police were to be mounted and efficiently equipped, but with as little brilliant display as possible. No person, said the Act, was to be appointed to the force "unless he be of sound constitution, able to ride, active and able-bodied, of good character, and between the ages of eighteen and forty years; nor unless he be able to read and write the English or French language." The minimum age was later increased to twenty-two. From the very first the mounted police force has attracted a high grade of men. University men and sons of peers have served in the ranks with the humblest. One of the best-known names in the English language, Dickens, appears in the record of the force because Francis Dickens, a son of Charles Dickens, was for several years an inspector. The work of the "mounties" requires thinking, and these men think for themselves. A trooper may be called on in emergencies to act in almost any conceivable capacity. Consequently the police are a body of self-reliant men.

The organization of the force was begun in the autumn of 1873. By October about 150 men had been sent to the temporary headquarters at Fort Garry, and on June 4, 1874, three divisions (about 200 men) left Toronto for the Northwest by way of Chicago, Saint Paul and Fargo. From Fargo they proceeded on horseback westward to the Saskatchewan. The hardships of this overland march are a part of the history of the great Northwest. How the police established their posts, how they broke up the illegal trade in whisky and stolen horses and cattle, how they won the fear and later the confidence of the Indians, how they really made possible the settlement of the Territories—these should be familiar stories to every school child.

Its Duties. There is scarcely a department of the Canadian government that is not assisted by these hardy troopers. Along the United States border they act as customs officials, preventing smuggling. They carry the mails to the distant settlements, they report on the condition of the roads, bridges, crops and weather, they fight prairie and forest fires, they take the census, and they often act informally as arbitrators or judges between settlers who have had disputes. They help travelers and are frequently called on to take care of the sick

or injured. For example, in the winter of 1904 word came to the police at Fort Chipewyan that a missionary had become insane at Peace Station. Constable Pedley took the madman to Fort Saskatchewan, 500 miles away by trail.



ROYAL NORTHWEST MOUNTED POLICE DISTRICTS

This was in the dead of winter, with the temperature often fifty degrees below zero, with terrible storms, during one of which Pedley had to lash himself and the missionary to a tree.

These duties, of course, are merely incidental to the main purpose of the force, to preserve law and order. In many of the remote districts they not only preserve the law but they frequently make or interpret it. The commissioned officers make regular trips to hold court. In tracking criminals these men have difficulties which seem almost insuperable. Only a handful of men to patrol thousands of square miles! Yet no detective or police force in the world can show a better record, and the efficiency of the police has earned for it the fear of all criminals and the admiration of all good citizens. The police regularly patrol all districts in which there are settlers. All over the prairies the mounted constables ride from homestead to homestead. Each constable carries a patrol sheet, on which any complaints of the settler are recorded. If nothing has happened to deserve the attention of the police, the constable writes "No complaints" and the farmer signs. The constable, too, is usually a man of experience, who can advise the farmer about matters pertaining to his crops or his herds. During the War of the Nations the "mounties" had the added duty of watching hundreds of alien enemies who were settled throughout the Northwest.

For a few years the Indians were the worst trouble makers in the Northwest, but even in its early days the police force had tremendous influence. As an illustration there was a famous episode shortly after the close of the Saskatchewan Rebellion. A band of 200 Indians, who feared punishment for their share in the rebellion, invited themselves across the border into the United States, where they met a cold welcome. The official wires were kept hot for a few days between Ottawa and Washington, and much correspondence ensued, until it was finally agreed that Canada would be responsible for the band if the United States would kindly escort it to the border. In due time 200 wild-eyed Crees, with 450 horses, were headed northwards in charge of a strong force of United States cavalry. At the boundary line they were met by three mounted policemen, one corporal and two troopers, who had with them one extra horse. The American commander looked at them in surprise.

"Where's your escort for these Indians?" he asked.

"We're here," answered the corporal.

"Yes, yes, I see. But where's your regiment?"

"I guess it's all here," replied the corporal. "The fourth man's looking after the breakfast things."

And the four "mounties" took over the band of Indians, and escorted them a hundred miles farther, where they could give Uncle Sam no more trouble.

Present Organization. The original number of 200 officers and men has been gradually increased until it has reached about 800. These are distributed over Alberta, Saskatchewan, Manitoba, the Yukon and the North West Territories. The force is divided into twelve main districts, each of which is commanded by a superintendent, who has under him a number of inspectors and other officers. Surgeons and veterinary surgeons are commissioned officers. The noncommissioned officers, as in the British army, are staff-sergeants, of various kinds, sergeants and corporals. The troopers are called constables. Each of the district headquarters maintains communication with all posts in its district, and is responsible for their direction to the central headquarters at Regina. The remotest detachments make their headquarters at Fullerton, on the northwest corner of Hud-

son Bay, and on Herschell Island, on the shores of the Arctic Ocean, 2,500 miles from headquarters at Regina. Regina is the residence of the commissioner and his assistant, who are the executive officers of the force. The permanent official head, the comptroller, resides at Ottawa. The Royal Northwest Mounted Police, although organized on military lines, is a civil body, and is under the direct control of the Premier. Both officers and men are entitled to pensions after twenty years of service, or a shorter period if they are compelled to retire on account of ill-health. W.F.Z.

ROYAL SOCIETY, The, the oldest scientific society in Great Britain and the most famous in the world. The full title is the *Royal Society of London for Improving Natural Knowledge.* Its members are called "fellows," and the initials, F.R.S., meaning "Fellows of the Royal Society," are generally placed, like a college degree, after their names. The organization was incorporated with the sanction of Charles II in 1662, but it was in existence as early as 1645. In that year weekly meetings of London scientists were held, and their work and discussions were so learned that even in 1646 the association was sometimes called the "invisible college." Within a year after incorporation it was carrying on active correspondence on learned questions with the philosophers and scientists of France, Germany, Spain and Italy, and in 1664 began the publication of its famous *Transactions.* More than 230 volumes of these have been published since that year, and the series constitutes by far the most valuable record of scientific achievement in existence.

Within ten years after its incorporation the society published such valuable results of its research work that it was considered as semi-official by the British government, and was given many important scientific commissions. In 1671, the year Sir Isaac Newton was elected a fellow, the association was appointed to direct the Royal Observatory at Greenwich, and this duty was followed by such as the correcting of the calendar in 1752, the protection of British ships from lightning, the measurement of a degree of latitude, the Antarctic Expedition of Captain Cook in 1772, the Arctic expeditions under Parry in 1819, Sir John Franklin in 1845 and Nares in 1874, the determination of the density of the earth, the accurate comparison of the metric and English systems of weights and measures and other noteworthy undertakings. The society practically controls the British Meteorology Department, the National Physical Laboratory, several scientific trust funds and the governing bodies of many British public schools. It is doubtful whether any other scientific association in the world approaches it in scope and power.

Admission into the society is most difficult to secure, and therefore the right to sign *F.R.S.* after one's name is a much-coveted honor in the scholarly world. Fifteen new members may be received annually, and each candidate must be vouched for by six members. C.H.H.

ROYCE, Josiah (1855-), an American philosopher, some of whose works have been widely read because their pleasing style makes them of more interest to the general reader than are most works on philosophy. His *Spirit of Modern Philosophy,* for instance, has given many people a delightful introduction to the great philosophers of modern times, of whom otherwise they might have remained in ignorance. Royce is not, however, a merely popular writer; he is a scholar as well, and *The Religious Aspect of Philosophy, The World and the Individual, Psychology* and *William James and Other Essays on the Philosophy of Life* contain real contributions to his chosen subject.

RUBAIYAT, *roo bi yaht',* an Arabic word, used to designate any collection of quatrains, or four-line stanzas. In English, however, it is applied almost exclusively to one series of such verse—that of Omar Khayyam, translated by Edward Fitzgerald (see Omar Khayyam). Several other English versions of the Rubaiyat have been issued, but that of Fitzgerald is by far the most popular, and justly so; for it is more than a translation; it is a genuine English poem, exquisite in its diction, yet reproducing most faithfully the spirit of the old Persian writer. Fitzgerald at times took liberties with the wording of his original, but never with its spirit, and the result is unique among translations. The following stanza is no less typical of the philosophy of the poem than of its manner:

> Come, fill the Cup, and in the fire of Spring
> Your Winter garment of Repentance fling:
> The Bird of Time has but a little way
> To flutter—and the Bird is on the Wing.

The stanza which is most quoted is probably the twelfth:

> A Book of Verses underneath the Bough,
> A Jug of Wine, a Loaf of Bread—and Thou
> Beside me singing in the Wilderness—
> Oh, Wilderness were Paradise enow!

Consult Brown's *Literary History of Persia.*

Copyright: Underwood & Underwood

IN A RUBBER FOREST.

Gathering sap, or "latex," to take to camp for boiling. Boiling rubber and rolling into balls for shipment. The form in which the balls appear for export.

TAPPING RUBBER TREES.

A sharp knife grooves the trees, usually as shown in the small upper picture.

RUBBER AND RUBBER MANUFACTURE. Where does rubber come from? Do we dig it out of the ground? Does it grow on trees, or is it made by combining a number of different substances? Probably many boys and girls have asked themselves these questions without finding a satisfactory answer. Rubber does not grow on trees, but it is obtained from a number of trees, shrubs and vines that grow in hot countries.

How Rubber is Obtained. We are all familiar with the milkweed (which see), and know that it is so named because of its milky juice. Experiments lead us to believe that there is a little rubber in this juice, but the quantity is so small that it would take cartloads of milkweed to give us enough rubber to make a small rubber ball. There are, however, in the valley of the Amazon, in the central part of Africa, in the East Indies and in some parts of Mexico and the southwestern part of the United States a number of plants from which rubber is obtained in paying quantities. The most important of these plants is the *hevea,* or rubber tree, as it is commonly called, and it is from the milklike juice of this tree that most of the rubber is obtained.

When an incision is made through the bark, the juice flows out slowly. The trees are "tapped" by cutting slanting grooves in them. A small cup is fastened to the tree at the lower end of the groove to collect the juice, which is gathered every evening. A pail of this juice looks somewhat like a pail of milk, and if it is allowed to stand for several hours, the rubber will rise to the surface like cream. The gatherer makes a smoldering fire of leaves and a kind of nut that grows in the forest, then takes a wooden paddle, dips it into the juice and holds it over the fire until the water has been evaporated, leaving a thin coat of rubber on the surface. He then dips the paddle again in the juice and holds it on the fire, and continues to repeat the process until his paddle is covered with a thick coat of rubber. He then cuts this open on one side, takes it from the paddle and rolls it into a ball, like those shown in the picture. These balls are collected and shipped to market.

The average tree yields about two ounces of juice a day. One-third of this weight is rubber, and about ten pounds of rubber are obtained from a tree in a year. The rubber obtained from the *hevea* tree by this process is of the highest quality and is known as *Para rubber,* because it is shipped in greatest quantities from the city of Para, in Brazil.

While the greatest part of the rubber of commerce is obtained from the juice of certain trees and vines, no inconsiderable quantity is obtained from shrubs, vines and trees in which it occurs in solid form in stems and roots. The Congo region in Africa abounds in plants of this sort. The guayule, a shrub growing from three to five feet high, is becoming an important source of rubber. This plant is of special interest because it is found in Northern Mexico and in the southwestern part of Texas, and because it can be cultivated in these regions and in Arizona, where large plantations are in successful operation.

Uses of Rubber. Rubber is used for so many purposes that were the supply cut off a number of important industries would be destroyed. We should have no rubber boots or shoes; we should have to find some other waterproof material for our raincoats; pneumatic tires, in universal use for bicycles and automobiles, would have to be replaced with those of a less desirable material and we should be obliged to do without telephones until some other material as convenient and not a conductor of electricity could be found to take its place. Besides these greater uses for which rubber is employed it enters into the manufacture of many small articles which have become indispensable in the home and the office, such as combs, buttons, rubber bands, erasers and fountain pens.

The importance of rubber in modern warfare may be realized in a measure from the following incidents:

Practically all the commissary supplies and ammunition required by the American troops south of the Rio Grande in 1916 were transported in motor trucks. An automobile train of 18,000 cars was employed by the French

BRANCH OF RUBBER TREE

The illustration is that of the *hevea,* the source of Para rubber, the best in the world. When only a few months old the tree is as tall as a man, and eventually reaches a height of over a hundred feet.

to rush reënforcements and munitions to Verdun during the first hours of the great German drive against that fortress in 1916. Napoleon said that an army marches on its stomach; a modern army marches on rubber. Rubber is as vitally a contraband of war as iron, steel and gunpowder.

Rubber Manufacture. The balls of crude rubber, when received at the factory, contain dirt and other impurities. The cakes are cut into small chunks which are run through a set of rollers over which water is flowing. The rubber comes from the washing machine in irregular strips with rough surfaces. These strips are dried and then taken to the mixing machine, where sulphur and occasionally other substances are mixed with the rubber to adapt it to the uses for which it is desired. The prepared rubber, then in the form of sheets, is ready for manufacture into the goods for which it is designed. For tires, belts and shoes it is combined with duck or some other strong fabric by laying the sheet of rubber on the cloth and passing them between rollers which press them together. Tubing is made by passing soft rubber through a mold. Cloth for mackintoshes or raincoats is prepared by laying a thin sheet of rubber between two layers of cloth and pressing them together between rollers.

The Story of Rubber. The Spaniards who followed Columbus to the western world sometimes saw the natives playing with balls made of the hardened milky juice of certain tropical trees. Later they learned that by putting a coating of this juice over their coats or shoes they could make them waterproof, and that the natives of some of the countries molded water vessels of this material, and even boots, which when smoked looked very much like leather. The name India rubber, the India part of which is little used now, originated in the eighteenth century in England, where it was noticed that the substance would erase or rub out pencil marks. Another name is *caoutchouc,* a word supposed to be Brazilian for *weeping wood.* The French still say *caoutchouc.* The Germans prefer *gommi* and the Italians and Spaniards *goma,* words which remind us that foot rubbers were once known in America as gums or gum shoes.

Not quite a century ago rubber began to assume importance in the northern world. It was in 1820 that a sea captain brought to Boston the first of the famous gum shoes, made in South America by dipping shaped pieces of wool into the rubber juice; clumsy as they were, it is said that over a million of them were sold before a better process was discovered. In 1823 the Scotchman who has left us his name in the raincoats called mackintoshes took out his patent, which was for placing a very thin sheet of rubber between two layers of cloth. Meanwhile an Englishman, Hancock, had discovered that pure rubber can be made into blocks or sheets of any shape by mechanical pressure. But in spite of all these ingenious contrivances rubber would have remained of minor importance had it not been for a fortunate discovery made in America in 1839.

Vulcanization. The rubber goods made in these early times would make us laugh to-day. They were ordinarily rather sticky, and in hot weather very much so, while in cold spells they became stiff and somewhat brittle. Charles Goodyear, whose story is told in another volume, made an end of this disconcerting weakness when he found that rubber mixed with sulphur and then heated to the melting point

THE FLIGHT INTO EGYPT

THE FLIGHT INTO EGYPT. There have been numerous attempts to imitate Rubens—he was too great to escape that fate: but the personality of the man was so dominating that it transcended all imitation. His breadth and sweep, his daring brush work, his rich and sensuous coloring, and above all, his masterly flesh tints, are the admiration and the despair of other artists; his works, widely popular, are not among those which appeal to the general public, but they are the wonder of the artist. In many of his works the dashing style might seem to indicate a hasty treatment, but the composition is as well worked out and the tones are as harmoniously blended as the severest critic could wish.

Rubens especially liked to deal with large spaces. A commission for a huge wall-painting in some cathedral brought him the keenest joy. But that he was no less skilful in dealing with small surfaces is evidenced by this little painting, which in the original is but fifteen inches high. This "sweetly luminous vision passing through the night," lighted less by the crescent moon than by the glory from the infant in Mary's arms, shows well the human quality of the work of Rubens; for even the angel guides have more than a touch of the earth about them, in their sturdiness and the rosy glow of their flesh.

L. J. B.

retains its good qualities but is no longer affected by temperature, and cannot be dissolved, as before, in naphtha, turpentine or chloroform. To Goodyear's process someone gave the name vulcanization, because Vulcan was the ancient god of fire (see GOODYEAR, CHARLES).

The Rubber Industry. Since the beginning of the twentieth century the demand for rubber has increased with remarkable rapidity, chiefly because of the popularity of the automobile. South America is the principal source of supply for the United States, and Africa for Europe, but the Malay Peninsula and Ceylon produce a considerable quantity. In addition to the native forests there are large rubber plantations in Brazil and Mexico. The juice from which the rubber is obtained does not seem to be necessary to the life of the tree, and trees continue to yield a flow of juice from year to year. Wherever the plants are destroyed to obtain the rubber other plants are set out so that the sources of supply are not only maintained but increased on rubber plantations in proportion to the demand for their product. The rubber boots and shoes made in the United States yearly are worth $60,000,000. W.F.R.

Consult Locke's *Rubber and Rubber Planting;* Pearson's *Rubber and Its Relations.*

RUBENS, *roo'benz,* PETER PAUL (1577-1640), the most celebrated painter of the Flemish school. He stands preëminent as a master of composition and ranks next after Titian and others of the Venetian school as a colorist. Not only was he distinguished as a painter of religious and mythological subjects, but he also excelled in portraiture, in landscape art and as an animal painter. He portrayed the Flemish peasantry in many different guises, and painted portaits of the monarchs and distinguished men of the many countries which he visited as diplomat painter. His charming personality, his courtly grace of manner, and his tact and intelligence made him a favorite with all classes, and he could converse in six different languages.

PETER PAUL RUBENS

Rubens was born at Siegen, a town of Westphalia, in Germany. After the death of his father, when Peter Paul was nine years of age, his mother returned to her native Antwerp. The youth then began his art education under the leading masters of this city. In 1600 he went to Italy, entering the service of the Duke of Mantua, for whom he executed a number of paintings and who intrusted him later with a secret mission to Philip III of Spain. Upon his return to Antwerp in 1608, he was appointed court painter to the Archduke Albert, who built for him a magnificent Italian mansion. About this time he painted his famous *Christ Bearers,* which, together with his masterpiece, *The Descent from the Cross,* hangs in the old Notre Dame Cathedral of Antwerp. His fame now was established. Pupils flocked to his studio, and sovereigns and princes vied with one another to show him favor.

In 1622 Rubens was invited by Marie de' Medici, mother of Louis XIII of France, to paint for the gallery of the Luxembourg at Paris a series of allegorical pictures illustrating scenes from her life. In 1628 he was sent on a diplomatic mission to Philip IV of Spain, and the following year was appointed envoy to Charles I of England to assist in private negotiations of a peace between Spain and England. For the success of his mission, he was knighted by Charles I. Philip IV conferred a similar honor upon him. While in these countries his brush was not idle, for he painted portraits of these monarchs and notables of their court.

Having wearied of an ambassador's life, he returned to Antwerp to enjoy his remaining years as a private citizen. Some of his best works belong to these later years, notably *The Holy Family of Saint George,* the *Crucifixion of Saint Peter* and *The Flight into Egypt.* The latter is faithfully reproduced herewith in color. So rapidly did Rubens work that he was known as "a perfect wizard with his brush." Sir Joshua Reynolds called him "the greatest master in the mechanical part of the art; the best workman with his tools that ever used a pencil." He left to posterity thousands of paintings covering a multiplicity of subjects.

The Metropolitan Museum in New York possesses, among other canvases, two of his finest examples of portraiture: *Anne of Austria* and *Cardinal Infant Ferdinand.* R.D.M.

Consult Stevenson's *Peter Paul Rubens;* Dillon's *Rubens.*

RUBICON, *ru'bi kon.* In the year 49 B.C., while Julius Caesar was in command of the

legions in Gaul, a decree was passed by the Senate ordering him to disband his army. In defiance of this command he led a band of veterans across the boundary between Nearer Gaul and Italy—the Rubicon River—and marched into Rome. This was virtually a declaration of war against the republic, and was his first step toward gaining supreme power. Because of this event the Rubicon has a permanent place in history, and the expression "to cross the Rubicon" has come to mean the first decisive step in a hazardous enterprise, from which there is no turning back. The ancient river was about twenty miles long and emptied into the Adriatic. It is not known definitely with which stream it is identical, but best authority favors the Fiumicino.

RUBINSTEIN, *roo'bin stine,* ANTON GRIGOROVICH (1829-1894), a pianist and composer, was born at Wechwotynecz, Russia. His family was Jewish, but each member had been baptized in the Greek Catholic Church in 1830, when Czar Nicholas had threatened expulsion of all orthodox Hebrews. His mother, and a Russian teacher, named Alexander Villoing, gave him practically all the musical training he ever received, although for a short time in 1840 he attended the Paris Conservatory. It was soon discovered that his musical intuition and technique were so great that the various teachers he met could add little to his knowledge of the art. Liszt and Chopin became his close friends and genuine admirers, and under their advice he received some instruction in composition from great teachers in Berlin.

When Rubinstein was but sixteen years old he began to teach in Vienna, and two years later went to Saint Petersburg (now Petrograd), where, in spite of his Jewish blood, his playing aroused extraordinary enthusiasm. The Grand Duchess Helen became his patron, supplied him with money and gave him frequent opportunities to be heard in public. There, in 1851, his first opera, *Dimitri Donskoi,* was presented successfully. He was later advised by Helen to make a concert tour of the larger European cities, and in 1857 played in Hamburg, Leipzig, London and other musical centers. His appearances in London were in the nature of triumphs, for few pianists had ever been able to stir all classes of citizens as he did.

In 1858 he was appointed director of the Royal Russian Musical Society and four years later founded the famous Conservatory of Saint Petersburg. His frequent concert tours throughout Europe made him by far the most famous pianist of his day, and when, in 1872 and 1873, he appeared in America his reception was most unusual. Crowds followed him about the streets of the larger cities, the throngs at the theater doors fought for places in line, and audiences often arose and cheered when he had finished the playing of a composition. In 1889 the Russian government made him a nobleman, with the honorary title of Imperial State Councilor. He died in Saint Petersburg on November 20, 1894. His compositions are exceedingly harmonious, and are notable for the completeness of the melody in each. Among his most popular works are the *Ocean Symphony,* the *Dramatic Symphony, The Demon* and *The Maccabees,* and the piano compositions *Melody in F* and *Kaminoi Ostrow.* A great oratorio was *Christus.*

Consult MacArthur's *Life of Rubinstein.*

RUBLE, or **ROUBLE,** *roo'b'l,* the Russian monetary unit, equivalent to 51½ cents in United States and Canadian money. It is divided into 100 kopecks, each having a value of about ½ cent. Since the seventeenth century the silver ruble has been the standard in Russia, but its value has been fluctuating, and it is only since 1897 that it has remained fixed at its present value. The 15-ruble and the 7½-ruble pieces, known respectively as the imperial and the half-imperial, are issued in gold, while the half and quarter rubles are of silver. After 1920 the ruble so depreciated that by 1922 a dollar would buy more than 30,000 rubles. They had practically no value.

RUBY, *roo'bi,* a transparent variety of corundum, and the costliest of all precious stones. It occurs in various shades of red, from deep scarlet to pale rose, but the most valuable ruby is that having the color of a pigeon's blood. True, or *Oriental,* rubies are found chiefly in Burma, Ceylon and Siam, but genuine stones of small size occur in Macon County, North Carolina, in stream gravels. Pigeon-blood stones come principally from Burma,

pomegranate-red from Ceylon, and garnet-hued from Siam. A ruby of good color, free from flaws, is worth many times as much as a diamond of the same size. There are several red stones on the market to which the name ruby is applied, but which are not genuine rubies. Some of these are imitations in glass. The so-called *Cape, Australian* and *Arizona* rubies are in reality fine garnets, and the *Siberian* ruby is red tourmaline. *Spinel* rubies are transparent red crystals of magnesium aluminate. Experts can readily distinguish genuine from spurious stones by tests as to hardness, specific gravity, etc. For the manufacture of artificial rubies, see GEMS.

According to the lore of precious stones the ruby is the birthstone for July, and the symbol for the fortieth wedding anniversary. It is believed by the superstitious that to dream of rubies is a sign of unexpected guests.

Consult Kunz's *The Curious Lore of Precious Stones.*

Related Subjects. The reader is referred to the following articles in these volumes:

Corundum	Garnet
Diamond	Gems

RUDE, FRANÇOIS (1784-1855), a French sculptor of highest rank, whose work is representative both of classic purity and of uncompromising realism. Among his finest achievements are *Mercury Fastening his Sandal, Neapolitan Fisher Boy* and a statue of Joan of Arc, all of which are in the Louvre. His artistic power is also revealed in the superb monument of *Godefroy Cavagnac,* in Montmartre. He studied at the School of Fine Arts in Paris and later went to Rome. His *Mercury Fastening His Sandal* and the *Neapolitan Fisher Boy* were his first successes. *Le Départ (The Departure)* is considered to be his greatest production. It was executed for the Triumphal Arch of the Star, and represents the departure of the volunteers from Paris in 1792.

RUFF, a species of sandpiper native to the eastern hemisphere. During the mating season the adult male develops a tuft of feathers on his neck, which is capable of being swelled out into a ruff, variable in color, changing from black, chestnut and reddish to buffy and whitish. He is also greatly disposed to fight at this season, boldly attacking intruders. The female is much more modest in plumage and in behavior, and is known as a *reeve.* Occasional specimens of the ruff have been taken on the coast of Eastern North America. See SANDPIPER.

RUFFED GROUSE, *grous.* See GROUSE, subhead *Ruffed Grouse.*

RUFFO, *ru'fo,* TITTA, an Italian baritone, born in Tuscany. At an early age he entered the Conservatory of Santa Cecilia at Rome, ambitious to fit himself for an operatic career. After two years of study he was told to select another profession, as his voice was not deemed equal to the success he coveted. But the youth believed otherwise. He was bent upon a musical career, and the criticism only made him the more determined, despite the fact that he was almost penniless and the choice of a profession could not be put off long. Undismayed, he went to Milan, where, under the instruction of Signor Cassini, he developed remarkable powers. Subsequently he sang in the larger cities of South America, and then made a triumphant tour of his native land. He made his début in the United States at the Metropolitan Opera House, New York, in 1912, and later appeared with the Chicago Grand Opera Company. Ruffo is admirable in dramatic as well as in lyric rôles, and has appeared in many of the world-famous operas. Among the operas in which he has won high honors are *Pagliacci* and *Hamlet.*

RUG'BY SCHOOL, one of the most celebrated of English public schools, was founded in 1567 at Rugby, England, through a bequest of Lawrence Sheriffe, a grocer of Rugby. The purpose of the founder was to establish a school for the boys of Rugby and the country adjacent to it. Because of litigation over the will the school remained in obscurity for the first hundred years of its existence. In 1688 it had only 100 students, and for the next hundred years the number did not increase. In 1777, Thomas James of Eton was elected head master. He introduced the Eton system of small, separate houses for the pupils, instead of lodging them all in one large dormitory, raised the standard of scholarship and improved the discipline. In sixteen years he increased the number of students from fifty-two to 245. Under his successor, Wooll, further progress was made. During the latter's administration the playground or "close" was enlarged, and Rugby football was developed.

But Rugby owes its reputation chiefly to Thomas Arnold, who became head master in 1828. When Arnold assumed his duties English public schools had reached a crisis, and there was a growing desire for the state to assume control. Taking conditions at Rugby as he found them, Arnold wrought changes that

within a few years extended to all the leading public schools of the country. He did not revolutionize the existing systems so much as he *humanized* them. He impressed his blameless life and strong personality upon every phase of the school's activities; he trusted the boys and made the upper classmen responsible for their own conduct and that of the boys in the lower forms. He emphasized the value of a religious and moral life and directed all the energies of the school to the building of character. His teaching and his sermons were an inspiration. Rugby soon became known from one end of England to the other, and to-day it is one of the most widely known schools in the world. The students number about 600, and the studies are mainly classical, but modern tendencies are making changes in the old order of subjects. Arnold's influence still remains, and no school stands above Rugby in scholarship and character. Rugby has become known to almost every schoolboy through *Tom Brown's School Days,* by Thomas Hughes, one of the school's most famous graduates. See ARNOLD, THOMAS.

Consult *Tom Brown's School Days,* noted above, and Rouse's *History of Rugby School.*

RUGS. See CARPETS AND RUGS.

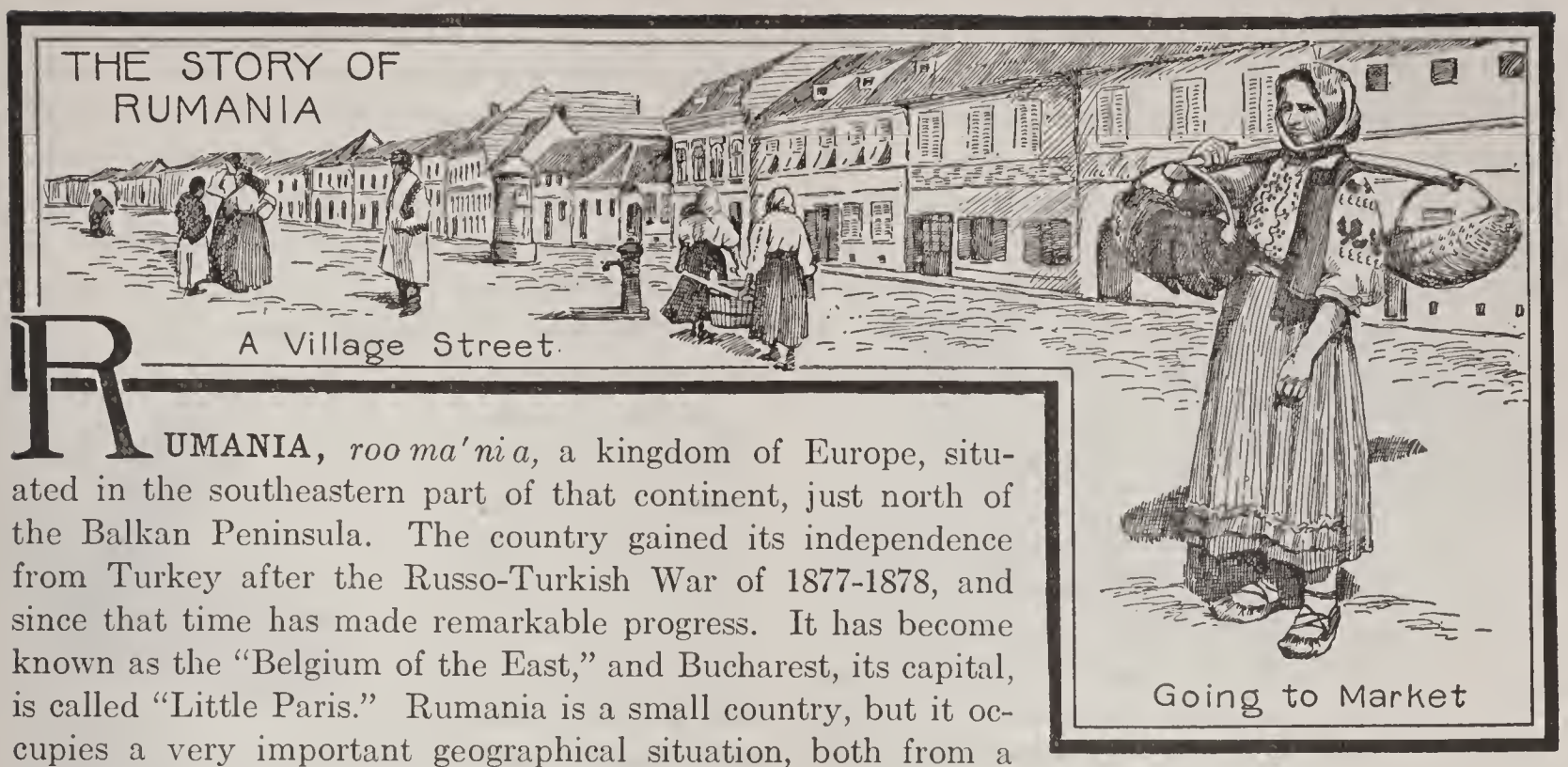
RUISDAEL, *rois'dahl,* JACOB. See RUYSDAEL, JACOB.

RULERS OF THE WORLD. In the table below are listed the names of the rulers of the world, according to the status of each country in 1917. Each country listed is described under its title in these volumes:

COUNTRY	RULER	ACCESSION	TITLE
Abyssinia	Zeoditu	1916	Empress
Afghanistan	Amanulla	1919	Ameer
Albania	Under Allies		Mpret
Argentina	Hipolito Irigoyen	1916	President
*Austria	Kirehner	1921	President
Belgium	Albert I	1909	King
Bolivia	Dr. Bautista Saavedra	1921	President
Brazil	Epitachio Pessoa	1919	President
Bulgaria	Boris III	1918	Czar
Chile	Arturo Alessandra	1921	President
China	Hsu Shi-Chang	1918	President
Colombia	Gen. Jorge Holquin	1921	President
Costa Rica	Federico Grandio	1917	President
Cuba	Alfredo Zayas	1921	President
Czecho-Slovakia	T. G. Masaryk	1918	President
Denmark	Christian X	1912	King
Eeuador	Dr. Jose Tamayo	1920	President
France	Alexander Millerand	1920	President
Germany	Frederick Ebert	1919	President
Great Britain	George V	1910	King
Greeee	George II	1922	King
Guatemala	Manuel Estrada Cabrera	1917	President
Haiti	Philippe Sudre Dartiguenave	1915	President
Honduras	Francisco Bertrand	1916	President
*Hungary	Horthy	1920	Regent
Italy	Vietor Emmanuel III	1912	King
Japan	Yoshihito	1912	Emperor
*Jugo-Slavia	Alexander	1921	King
Liberia	Chas. D. B. King	1920	President
Liechtenstein	John II	1858	Prinee
Luxemburg	Charlotte	1918	Grand Duehess
Mexico	General Adolfo Obregon	1920	President
Monaeo	Albert	1889	Prince
Netherlands	Wilhelmina	1898	Queen
Nicaragua	Emiliano Chamorro	1917	President
Norway	Haakon VII	1905	King
Oman	Seyyid Taimur bin Turkee	1913	Sultan
Panama	Belisario Porras	1920	President
Paraguay	Felix Paiva	1920	President
Persia	Ahmed Mirza	1914	Shah
Peru	Jose Pardo	1915	President
*Poland	Pilsudski	1920	President
Portugal	Antonio Almeida	1919	President
Rumania	Ferdinand I	1914	King
Russia	Soviet	1917	
Salvador	Carlos Meléndez	1916	President
Santo Domingo	Frederico H. Carvajal	1916	President
Serbia	Regency		
Siam	Vagiravudh	1910	King
Spain	Alfonso XIII	1886	King
Sweden	Gustaf V	1907	King
Switzerland	E. Schulthess	1921	President
Turkey	Mehmed VI	1918	Sultan
United States	Warren G. Harding	1921	President
Uruguay	Feliciano Viera	1915	President
Venezucla	Juan Vicente Gómez	1915	President

*Permanent governments formed in 1919.

RUM, a strong alcoholic drink, produced mainly from molasses. The word is an abbreviation of *rumbooze, rum* being an Asiatic word for *good,* and *booze* a derivation of the German *bausen,* meaning to *guzzle.* The liquor is made by fermenting and distilling molasses and the refuse from the making of cane sugar. When first produced, rum is white and transparent, but is given a dark brown color by the addition of caramel and by being stored in casks that have contained sherry. Its strength and flavor increase greatly with age, and a cask that has been stored for as long as ten years will bring a higher price than almost any other form of alcoholic beverage. The finest quality is now produced in Jamaica, and takes its name from that island. It is an exceedingly strong liquor, containing sometimes as much as eighty-two per cent of alcohol, and should never be used except for medicinal purposes. See BACTERIA AND BACTERIOLOGY.



RUMANIA, *roo ma'ni a,* a kingdom of Europe, situated in the southeastern part of that continent, just north of the Balkan Peninsula. The country gained its independence from Turkey after the Russo-Turkish War of 1877-1878, and since that time has made remarkable progress. It has become known as the "Belgium of the East," and Bucharest, its capital, is called "Little Paris." Rumania is a small country, but it occupies a very important geographical situation, both from a strategical and a commercial point of view. It forms the easiest approach from the north towards the Balkan Peninsula and Constantinople, and it contains the mouth of the Danube, that very important artery of communication and commerce of Central Europe; thus it possesses the shortest water route between Central Europe and Asia. At the same time the extensive plain of the Danube constitutes the natural highway between the east and the middle of Europe.

Size and Location. Rumania added greatly to its area by the outcome of the War of the Nations. In 1914, at the beginning of the struggle, it covered 53,489 square miles, almost the exact area of Arkansas. It was bounded on the north by Russia, and on the south by Bulgaria, being separated from the latter over most of the boundary by the Danube River. On the east it bordered on Russia and the Black Sea, and on the west it adjoined Serbia for a short distance, most of the curving western boundary following the Carpathian Mountains and the Transylvanian Alps, which lay as a barrier between Rumania and Hungary. The portion of the country lying south and east of the Danube, or the Dobrudja, was acquired by Rumania after the war of 1877-1878, having been exchanged for the southern part of Bessarabia, which was taken by Russia. At the close of the War of the Nations Rumania laid claim to Transylvania, a province of Hungary; Bukowina, a crownland of Austria; and Bessarabia. The allied council was to decide these claims.

The People. Before the outbreak of the War of the Nations in 1914 Rumania had a population of 7,508,009. After the war much territory was added. In 1919 the population was announced as 17,398,149. There were in the country about 250,000 Jews and 200,000 gypsies, besides a great number of Bulgarians, Serbs, Germans, Hungarians, Turks and Armenians. There were, perhaps, 4,000,000 Rumanians scattered through neighboring countries. The Rumanians belong to the Latin race and speak a Romance language, that is, one derived from the Latin. It is most like the Italian of all the Romance languages. Over eight-tenths of the people are peasants, and their chief occupation is agriculture. They passionately love their country, and the greatest desire of each farmer is to own the piece of land he tills. This feeling has been beautifully expressed by a modern poet, himself a peasant, in a poem entitled *We Want Land,* which has become the rallying song of the peasants. In February, 1919, a land reform measure was passed which provided for the division of the large estates into small farms for the peasantry. This law will transform Rumania into a land of small farms and prosperous farmers.

LOCATION MAP
Rumania's commercial and political importance is not to be measured by its size.

The principal towns are Bucharest, the capital; Jassy, Galatz, Braïla, Ploësti and Craiova.

Physical Features. The Carpathian Mountains and their prolongation, the Transylvanian Alps, form the most striking physical feature of

the country. They contain a number of rugged peaks 8,000 feet high, and present in several places fine mountain scenery. These mountains are usually covered with dense forests of fir and pines. Spurs of the Carpathians extend into the country for short distances and then the ground slopes gradually through a series of hills to the extensive level plain of the Danube, which is another striking surface feature of the country. Rumania is well watered by several rivers which run southward and flow into the Danube.

Climate. The climate is healthful, but it is subject to great extremes of temperature. The winters are bitterly cold, the plains being swept by cold winds blowing from the steppes of Russia. The whole country is covered by a thick mantle of snow for several months. The summers are very hot, the thermometer rising sometimes to over 100° F. in the shade. Spring lasts only a few weeks, but autumn is long and forms the most delightful season of the year. The rainfall is usually abundant, but the country suffers sometimes from droughts.

Natural Resources. *Agriculture.* Rumania is a very fertile country, its extensive plains being covered with a deep layer of rich, black soil formed chiefly of loess or alluvial deposits. Nearly one-third of the old area is under cereals. Corn, which forms the staple food of the people, is the chief crop; next in importance comes wheat. About 110,000,000 bushels of corn and about 90,000,000 bushels of wheat are raised annually. With better methods of agriculture the production could be greatly increased; the most primitive methods and implements are still used, except upon the large estates, where modern machinery is being introduced. Other grains raised in large quantities are oats, barley and rye. Nearly half a million acres are occupied by vineyards and orchards, and large quantities of grapes and all kinds of fruit are grown. There are a great number of plum trees in the country; the plums are mostly used in the distillation of a special alcoholic beverage which is the national drink.

In its extensive forests, which cover nearly 6,000,000 acres, Rumania possesses another important source of natural wealth. The chief trees are oak, beech, pine, fir, elm, willow and walnut.

Minerals. The country is rich in mineral resources. In the foothills of the Carpathians are found some of the most extensive oil basins in the world. Although the working of the oil fields dates only from the beginning of the twentieth century, Rumania occupies the fourth place among the oil-producing countries of the world. The output is about 1,750,000 tons a year. A pipe line owned by the government connects the principal oil field with Constantza, the country's chief port on the Black Sea. In the foothills of the Carpathians are also found some of the most extensive deposits of salt rock in the world. The extraction of the salt is a government monopoly and some of the salt mines are worked by convicts who have been sentenced for life or for long terms. (Capital punishment does not exist in Rumania.) Other minerals found here are coal, iron, copper and gold. There is a great abundance of all kinds of building stones and of marble of good quality.

COMPARATIVE AREAS
Rumania has 53,689 square miles of territory; Florida's area is 58,666 square miles.

Commerce and Industry. Rumania has normally a thriving export trade in wheat, corn, other grains, oil, wood and flour. With the exception of numerous flour mills and several oil refineries, there are no industrial establishments in old Rumania. The land is provided with a network of railroads, which traverse it both from north to south and from east to west. In 1914 there were 2,382 miles of rail, most of which were owned and operated by the government. The railway line to Constantza is carried across the Danube at Cernavoda over a bridge eleven miles long. The Danube serves as a great artery of communication and trade, and the two neighboring towns of Braïla and Galatz, situated at the head of deep-water navigation, are the great grain-exporting ports of the country. The Danube is frozen for about three months each year.

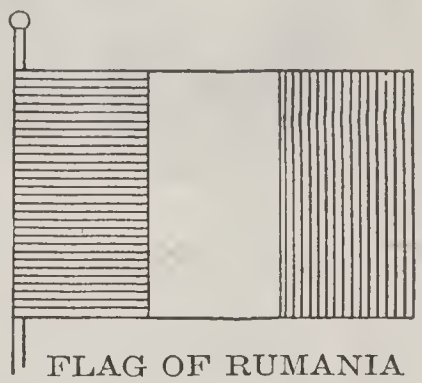
Government. Rumania is a constitutional monarchy, the throne being hereditary in the male line of descent. The constitution under which the country is governed was adopted in 1866 and was modeled after the constitution of Belgium; it was twice amended, in 1879 and in 1884. The executive power is vested in the king and in a Cabinet of nine Ministers, who are responsible to Parliament for their acts. The legislative power is vested in the Chamber of Deputies, the 183 members of which are

elected for four years, and in the Senate, which consists of 120 members, elected for eight years. The voters are divided into classes, called electoral colleges, the class distinction being based upon property owned, the amount of taxes paid or educational qualifications. This system deprives the peasants, the overwhelming mass of the people, of any representation in the Senate, and gives them only a small and inadequate representation in the Chamber of Deputies.

Religion and Education. The Rumanians belong to the Greek Orthodox Church, which is the official religious establishment of the state, but all religious bodies enjoy full freedom of worship. Education is free and compulsory, all the schools being maintained by the government, but the percentage of illiteracy is high. At the head of the educational institutions are the two universities, one at Bucharest and the other at Jassy.

History. The territory included in old Rumania was occupied in ancient times by a people called Dacians. The Roman Emperor Trajan conquered the whole region (101-106 A. D.) and brought here many Roman colonists. Known as Dacia, it was the first Roman province to feel the shock of the barbarian invasions. From the third until the end of the tenth century this region was invaded by various barbaric peoples who swept from Eastern Europe toward the southern and central parts. Finally, in the thirteenth century, the two independent principalities of Wallachia and Moldavia were constituted. After the Turks conquered the Balkan Peninsula in the fourteenth century these two principalities recognized the suzerainty of the sultan of Turkey and became autonomous provinces of the Ottoman Empire. During the nineteenth century Russia acquired a right of protectorate over both Wallachia and Moldavia. But the national spirit began to awaken and the desire for the union of both provinces and their independence became very strong. The Congress of Paris of 1856 put the principalities under the joint protection of the Great Powers. In 1859 Moldavia and Wallachia elected as their ruler the same prince, and thus became united under the name of Rumania. In 1866 the prince resigned and Charles of Hohenzollern was called to the throne. The country remained under the nominal suzerainty of the sultan of Turkey until 1877, when the Russo-Turkish War broke out. Rumania then declared its independence and joined Russia in the war. The young Rumanian army played an important part in the capture of Plevna, which decided the outcome of the war. The Congress of Berlin (1878) formally recognized the independence of the country. In 1881 Prince Charles proclaimed himself king. He was succeeded in 1914 by Ferdinand I.

THE ROYAL COUPLE
King Ferdinand and Queen Marie of Rumania.



FLAG OF RUMANIA
Vertical lines, red; horizontal lines, dark blue; plain surface, yellow.

Rumania did not take part in the first Balkan War against Turkey, but helped Serbia and Greece to defeat Bulgaria in the second Balkan War. By the Treaty of Bucharest (August 7, 1913) it obtained from Bulgaria a stretch of disputed territory which amounted to 2,969 square miles, with a population of 275,000.

In the War of the Nations Rumania remained neutral at the beginning, although manifesting strong sympathies for the allies. In the hope of gaining the provinces of Transylvania, Bukowina and Banat, and liberating their oppressed kinsmen from the rule of Austria-Hungary, they finally entered the war on the side of the allies; war was declared against Austria-Hungary on August 27, 1916. Soon afterwards the Rumanian armies invaded Transylvania, against the advice of the English and the French, who preferred that they wage a defensive campaign. The central powers launched then a strong offensive, and after a campaign lasting only three months the country was overrun, and more than half, including entirely the Dobrudja, was occupied by the enemy. After the fall of Bucharest (December 6) the seat of the government was moved to Jassy. Rumania was forced by the collapse of Russia to sign the humiliating Peace of Bucharest in March, 1918. The defeat of the Central Powers later in the year brought about the liberation of the entire country, and Rumania vigorously pressed its territorial claims

Outline and Questions on Rumania

I. Position

(1) Latitude
(2) Longitude
(3) Boundaries
(4) Importance of position
  (a) Relation to Russia and Austria-Hungary
  (b) Easiest approach to Balkan peninsula
  (c) Contains mouth of Danube

II. Size

(1) Actual, 53,485 square miles
(2) Comparative
(3) Population
(4) Addition of the Dobrudja

III. Country and Its People

(1) Physical features
  (a) Carpathian Mountains
  (b) Danube plain
(2) Extremes of climate
(3) Rainfall
(4) The people
  (a) Races
  (b) Language
  (c) Education
  (d) Religion

IV. Resources and Industries

(1) Agriculture
  (a) Methods
  (b) Chief crops
  (c) "We want land"
(2) Forests
(3) Minerals
  (a) Oil
  (b) Other products
(4) Commerce and transportation

V. Government and History

(1) Constitutional hereditary monarchy
(2) Legislative branch
(3) Early history
(4) Independence achieved
(5) Balkan Wars
(6) War of the Nations

Questions

Why has the capital of this country been called "Little Paris" (see Bucharest)?

Give three ways in which the geographic position of Rumania makes it of importance.

What is the Dobrudja, and when did it come into the possession of this country?

What state of the American Union does Rumania most closely resemble in size?

Is it more or less densely populated than is that state?

Is the state which it most closely resembles in number of inhabitants larger or smaller than the country?

What poem has become the rallying song of the Rumanian peasants?

How many countries produce more corn than does Rumania? How do these countries which surpass it in production compare with it in size?

For what are plums chiefly used in Rumania?

By what name was this territory known to the Romans? What part did it play in Roman history?

What part did it play in the War of the Nations?

at the peace conference. In the summer of 1919 a Rumanian army occupied Budapest, Hungary. See HUNGARY. O.B.

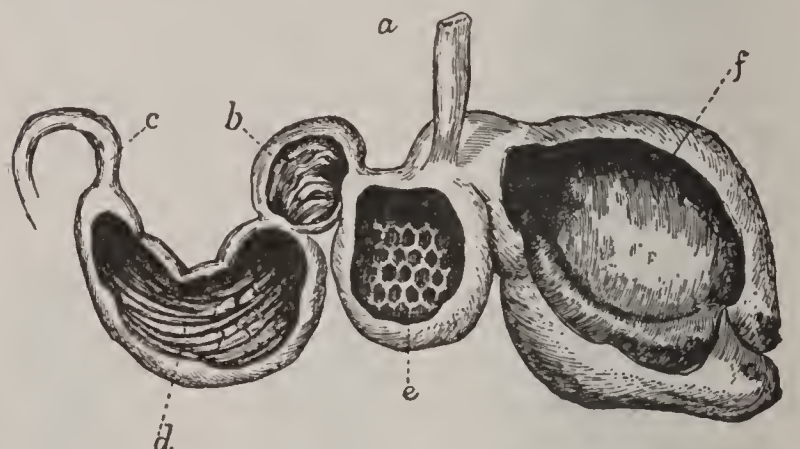
Consult Kirke's *Domestic Life in Rumania;* Miller's *The Balkans,* in Story of the Nations Series.

Related Subjects. The reader of this article on Rumania is referred to the following topics in these volumes:

Balkan Wars	Danube
Bucharest	Greek Church
Carpathian Mountains	Russo-Turkish War
Corn	War of the Nations

RUMELIA, *roo me'li a,* a name formerly given to that part of the Balkan Peninsula which was under the rule of the Turkish Empire.

RUMINANTS, *roo'mi nants,* the name applied to grazing animals which chew the cud, and which are further characterized by their split hoofs. They include camels, llamas, deer, sheep, goats, giraffes, pronghorns, antelopes,



CROSS SECTION OF STOMACH

(*a*) Oesophagus; (*b*) psalterium; (*c*) duodenum; (*d*) abomasum; (*e*) reticulum; (*f*) rumen, or first stomach.

cattle; that is, nearly all the mammals of greatest economical importance. With the exception of the camel they have no incisor, or cutting, teeth in the upper jaw, the place being occupied by a callous gum, against which the lower incisors bite. The mouthful of grass is mixed with saliva and swallowed into the paunch. Later, when the animal is resting, the mass of food is propelled upward into the mouth by a muscular action similar to vomiting, and the food is slowly masticated by a kind of rotary motion of the jaws, called "chewing the cud." The cud is swallowed again and passes at once into the second cavity, called the *honeycomb bag,* a name referring to the cells which form its lining, and which are like those of a honeycomb. The food is then assimilated. The ruminants are a division of that group of the animal kingdom known as ungulates (which see).

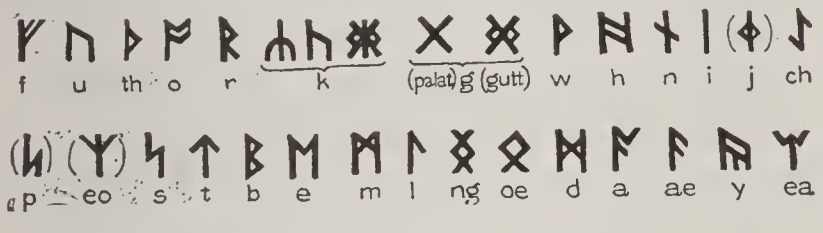
RUMP PARLIAMENT, *pahr'li ment,* in English history, the name given to the remnant of

the Long Parliament which, in conjunction with Cromwell's army, brought about the condemnation of Charles I. On December 6, 1648, two regiments under the command of Colonel Pride entered the House of Commons, for the purpose of forcing its members to condemn the king. The majority of the members were imprisoned or driven out, and only sixty of the more violent Independents were permitted to retain their seats. The clearance was called *Pride's Purge,* and the sixty members, forming the *rump,* or fag-end, of the Parliament, were known by the name of the Rump Parliament ever afterward. When the Rump attempted to make a stand against certain demands of the army in 1653, Cromwell filled the House with soldiers, pulled the Speaker out of the chair, cleared the room, and declared the Parliament to be dissolved. It was revived twice after this, and in March, 1660, it decreed its own dissolution.

Related Subjects. The reader is referred to the following articles in these volumes:

Commonwealth of England
Cromwell, Oliver
Long Parliament
Restoration

RUNES, *roonz,* the earliest written characters used by the Teutonic races of Europe. The name came from a word which meant *secret,* and was closely akin to the word for *magician,* thus showing that these characters were



ANGLO-SAXON RUNES

originally known only to a few, probably the heathen priests. Indeed, they were at first used exclusively in charms and incantations, though later inscriptions of all sorts, on monuments, slabs, coins and willow wands, were scratched in runic characters.

The origin of the runes, as well as the date of their invention, is unknown, but it seems probable that they were derived from the Latin alphabet and that they were in use as early as the third century A.D. Traces of their use are to be found in Germany, France, Spain, England, Denmark, Norway and Sweden, but the three last-named countries have the great majority of runic monuments. The runes were made entirely of straight lines, probably because it would have been difficult to scratch curves on wood. The Norsemen themselves ascribed the invention of the sacred characters to Odin, chief of the gods, who was supposed to have scratched the first specimens on his spear. Thus they were always identified with heathen worship, and the earliest Christian missionaries to the countries where they were in use did their best to replace them with the Latin alphabet. The runes were retained in Scandinavia far longer than in any other region.

RUNJIT SINGH, *run jeet' sing* (1780-1839), a ruler of the Punjab, India, and founder of the Sikh kingdom, was the son of a Sikh chieftain. His father died when Runjit was six years old, and the government fell to his mother. When he was seventeen Runjit rebelled against his mother, gained control of the government and directed all his energies to founding a kingdom which should unite all the Sikh provinces. He was granted Lahore by the shah of Afghanistan, and within a few years subdued all the northern provinces. The chiefs of the provinces to the south asked for British protection, and in 1809 an agreement was reached whereby the Sutlej River became the southern boundary of Runjit's dominions. With the aid of British and French officers Runjit then organized his army after European models and made a complete conquest of the Punjab, over which he assumed rule under the title of maharajah, or king of kings. In 1836 he suffered a severe defeat by the Afghans, but continued to rule over the territory until his death.

RUNNIMEDE, *run'i meed,* a meadow of interesting historical associations, because it was there or near there that the barons of England compelled King John to sign the Magna Charta, on June 15, 1215. Runnimede is twenty miles southwest of London, in Surrey. It lies on the right bank of the Thames River and is used as a race course. Whether the signing of the charter took place in the meadow or on an island near by is a matter of dispute. See MAGNA CHARTA.

RUPEE, *roo pe',* in the monetary system of British India, the unit of value and the standard coin. Such coins have been current since long before British occupancy—since the middle of the sixteenth century, in fact; but they have varied largely in value. In 1832 the weight of the rupee, which is of silver, was fixed by the British at 180 grains, troy weight, of which 165 grains were to be pure silver, and this has remained the fixed standard to the present day. Of necessity the value of the coin has fluctuated as silver has risen and depreciated in value, and this has proved to be a

source of much distress. In 1899, to remedy this defect, the government fixed the value at one-fifteenth of a pound sterling, or about 32 cents of United States or Canadian money, and in that ratio it has since remained legal tender.

The rupee is in size between the United States quarter-dollar and half-dollar pieces. It bears on its obverse side the impression of the British sovereign, on its reverse the words *One Rupee* and the date of coinage. Legally it is divided into 16 annas, and there are issued in silver 8-anna, 4-anna and 2-anna pieces. The sum of 100,000 rupees is commonly spoken of as a *lakh* of rupees, while 10,000,000 rupees constitute a *crore*.

RU'PERT, PRINCE (1619-1682), one of the main supporters of the royal cause in the struggle between Charles I of England and his Parliament. He was the son of Frederick V, Elector Palatine, and Elizabeth, the daughter of James I of England, and he played an important part during the Thirty Years' War.

When the civil war broke out in England, he was made leader of his uncle's cavalry and fought valiantly at Worcester and at Edgehill. Charles I did not find him as tractable as he wished, however, and for his surrender of Bristol, in 1645, dismissed him from his service. Later he became commander of the royalist fleet, but in the days of the Commonwealth was defeated by Admiral Blake. Escaping with a few ships, Prince Rupert made his way to the West Indies, where he engaged in piratical adventures. When Charles II came to the throne (see RESTORATION) he returned to England and served in the fleet during the war against Holland. The later years of his life were given up to scientific investigations.

RU'PERT'S LAND, a name formerly applied loosely to the Canadian Northwest, and more especially to the land surrounding Hudson Bay. This vast region, whose boundaries were only vaguely determined until the Dominion was organized in 1867, was named in honor of Prince Rupert, the first governor of the Hudson's Bay Company. This territory was granted to the company by Charles II of England and was only surrendered by the company in 1869, when the title was transferred to Great Britain. In 1870 title was formally transferred to the new Dominion of Canada. As a part of Canada the Northwest was originally called "Rupert's Land and the North West Territories," but the term Rupert's Land is no longer in use.

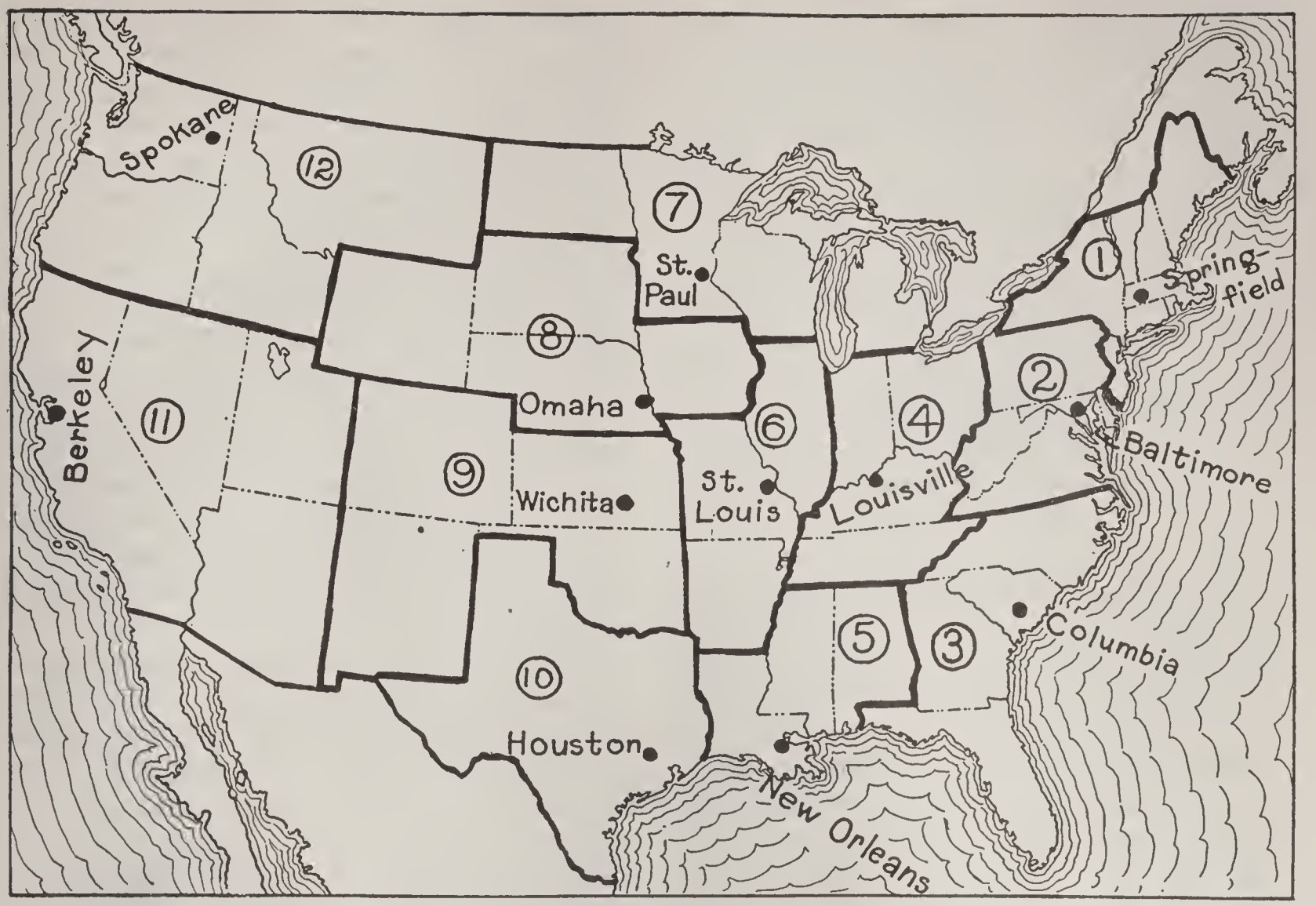
RUP'TURE. See HERNIA.

RURAL CREDITS. On July 17, 1916, President Wilson signed the Federal Farm Loan Act which provides for a national system of rural credits for the United States. The law is elaborate and covers all conceivable cases that may arise in connection with loaning money on land and securing the loans by first mortgages. From beginning to end the law is in favor of the farmer. The following are its most important features:

The Federal Farm Loan Board. A Federal Farm Loan Board consisting of five members is created, of whom the Secretary of the Treasury of the United States shall be one. The other members are appointed by the President, with the concurrence of the Senate; not more than two of these members can belong to the same political party. No member of the board shall, during his continuance in office, be an officer or director in any institution, association or partnership engaged in banking or in the business of making land mortgage loans or selling land mortgages. The members of the board are required to devote their entire time to the work; each receives a salary of $10,000 a year and his traveling expenses. One of the members is designated by the President as Farm Loan Commissioner.

Federal Land Banks. The Federal Loan Board was required to divide the United States into twelve districts, to be known as Federal land bank districts, to establish in each district a Federal land bank and to designate the city in which the chief office of the bank should be located. These districts and cities are shown in the map on page 5109. Each bank is under the management of a board of directors. When a bank is organized the Federal Farm Loan Board appoints five directors, who choose one of their number as president, one as secretary and one as treasurer. When the subscriptions to the stock of the bank amount to $100,000 a permanent board of nine directors, each holding office for three years, is selected. Six of these directors are chosen by the national farm loan associations, and three are appointed by the Federal Farm Loan Board. One-third of the members of the first board retire at the end of one year, one-third at the end of two years and one-third in three years, their successors in each case being elected for three years.

Every Federal land bank is required to have a subscribed capital of at least $750,000 before it can begin business. The capital stock is divided into shares of five dollars each, and it may be subscribed for and held by any indi-



FEDERAL LAND BANK DISTRICTS

The city shown in each district is the location of a land bank and a farm loan board; these have jurisdiction over all rural credits in the district.

vidual, firm or corporation, or by the government of any state or of the United States. Stock held by national farm loan associations cannot be transferred nor assigned for security.

National Farm Loan Associations. The Federal land banks make their loans through national farm loan associations, which are organizations of persons who wish to borrow money on land, giving a first mortgage for security. Each association chooses a board of directors, and they select a secretary-treasurer, who is the executive officer of the association. His duties consist in collecting and receipting for all money received, such as interest, partial payments on loans, and principal, and forwarding the same to the Federal land bank in the district in which the association is located. He is also required to pay to the borrower the money loaned him by the Federal land bank.

The stock of these associations is divided into shares of five dollars each, and each applicant for a loan is required to subscribe for one share for every $100 or major part thereof which he borrows, paying cash for his stock when he applies for his loan. The stock is held as security for the payment of the loan, and is retired and paid in full when all payments have been met by the borrower. Each national farm loan association must have at least ten members, and it cannot begin business until the loans applied for amount to at least $20,000.

How to Secure a Loan. Any farmer desiring to borrow money under this law should take the following steps:

1. Join the national farm loan association nearest to the locality in which he lives or in which his land is located, paying in five dollars for one of its shares for every $100 he wishes to borrow.
2. Make application to the association for the loan, giving his personal note therefor, secured by a first mortgage on his farm.
3. The land is then examined by authorized members of the association and an appraiser of the Federal land bank. If the application is approved the bank forwards the money to the secretary-treasurer of the association, who pays it over to the farmer. No commission, brokerage or "rake-off" is charged the farmer, and the rate of interest cannot exceed six per cent.

Advantages. The law confers the following advantages on the farmer:

1. It gives him the privilege of borrowing money to the amount of his security without having to pay high commissions and a high rate of interest.
2. It provides for long-time loans not less than five nor more than forty years—on a plan

of partial payments each year, so that when the loan falls due the final payment will be small.

3. It recognizes a number of purposes for which money may be borrowed. These are:

(*a*) To purchase land for agricultural purposes.

(*b*) For equipment, fertilizers and live stock.

(*c*) For erecting or improving buildings.

(*d*) For discharging a prior mortgage.

Restrictions. The law places the following safeguards around these loans:

1. It will not make a loan on land that is not occupied or tilled by the owner.

2. Loans cannot be made for less than $100 nor for more than $10,000.

3. The borrower is required to spend the money for the purposes for which it was loaned to him.

4. The amount of the loan cannot exceed fifty per cent of the value of the land and twenty per cent of the value of the buildings and other insurable property on it. W.F.R.

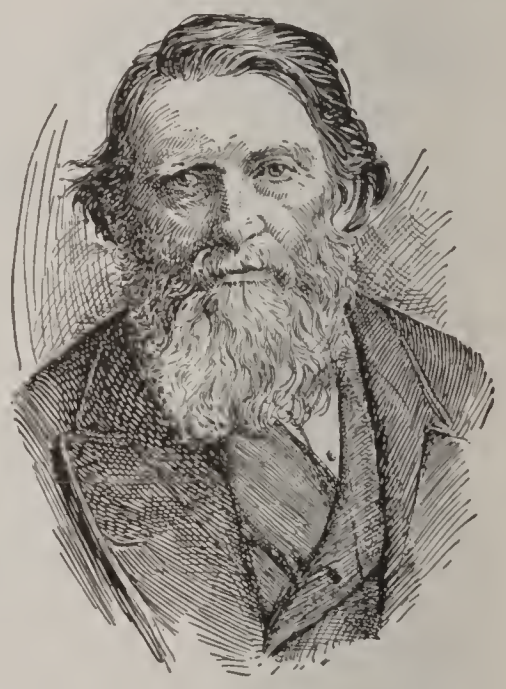
Consult Morman's *Principles of Rural Credits;* Herrick's *Rural Credits.*

RUSH, a reedlike plant of the sedge family. The common rush is characterized by slender, leafless stems which grow in clumps to the height of two or three feet. Rushes are found in marshes along the banks of streams and in shallow water near the shores of lakes and ponds. The stems are strong and flexible and are employed in making baskets and mats, chair bottoms and ropes. The stems of the *scouring* rush contain particles of silica and are useful in brightening tinware and other metallic household utensils. In Shakespeare's time candles called *rushlights* were made by dipping in grease rushes stripped of the green outer coat. See Bulrush; Horsetail Rush.

RUSH, Benjamin (1745-1813), an American physician, prominent in almost all of the great public movements in the early history of the United States. He was born at Byberry, Pa., graduated from Princeton at the age of fifteen, and in 1768 took his medical degree at Edinburgh University. In the next year he began to practice in Philadelphia, becoming at the same time professor of chemistry at the Medical College in that city. He had a great interest in all reforms or philanthropic movements. Thus in 1774 he helped to found the first American antislavery society, of which he was for many years secretary, and later president. The Rush Medical College, in Chicago, was named for him.

He was a member of the Continental Congress, a signer of the Declaration of Independence, and during the first two years of the Revolution saw active service in the field as surgeon-general. The founding of Dickinson College was due largely to his interest in free education, and the first dispensary in the United States was established by him in 1785. After 1787, when he was a member of the Pennsylvania committee for the ratification of the Federal Constitution and one of the framers of the state constitution, he took little part in public life, devoting himself to his practice and to his professional duties at the University of Pennsylvania. During the yellow fever epidemic of 1793 he did extremely efficient work, for which he received various honors. He was treasurer of the United States mint from 1799 until his death. Rush's writings are numerous, and include dissertations on topics of general interest as well as on medical subjects.

RUS'KIN, John (1819-1900), a great English art critic, social reformer and writer, born in London. His parents were well-to-do Scotch people who attended most carefully to the training of their son, securing for him the best of private instruction and taking him about with them on their extensive travels through England and Scotland. Moreover, his moral and spiritual development was helped by his early familiarity with the Bible, and by the practical righteousness that he saw in the lives of his father and mother. Surrounded by favorable conditions, he began to write both prose and poetry even before beginning his course at Oxford (1837), and while at the university he won the Newdigate prize for his poem called *Salsette and Elephanta.* In the year after his graduation he produced the first volume of his great work of art criticism, *Modern Painters,* and other volumes appeared at intervals during the next seventeen years. Ruskin's original intention in this work was to prove that modern landscape painters, and especially Turner, were superior to the old masters, but his design broadened as he went on until the work came to be a comprehensive discussion of art. Before this work was finished Ruskin published



JOHN RUSKIN

The Seven Lamps of Architecture and *The Stones of Venice,* both intended to instruct his readers in architectural subjects.

Until 1860 he devoted himself chiefly to the criticism of art, but in that year, with the appearance of *Unto This Last,* he declared himself a social reformer. He then actively interested himself in improving the conditions of the English working classes, and spent the greater part of the fortune which his father left him on philanthropic undertakings. He greatly improved the condition of several London tenement houses, and established a model village called Saint George's Guild, where the inhabitants were to live in true social unity. He also founded and endowed educational institutions of various kinds, and otherwise proved himself most earnest in his service for humanity. His influence was widespread and always wholesome.

From 1871 to 1879 and from 1883 to 1884 he was Slade professor of fine arts at Oxford. After resigning from this position he lived at Brantwood near Coniston Lake until his death.

Greatest of his works produced after 1860 are *Fors Clavigera,* letters written for English workingmen; *Sesame and Lilies,* delightful essays on literary and educational subjects; *Ethics of the Dust; The Crown of Wild Olive; The Queen of the Air,* a discussion of Greek cloud and storm myths; *Mornings in Florence,* and *Praeterita,* a rather sketchy review of his life. Ruskin's influence on art was very strong, for in *Modern Painters* he showed the need, never before clearly recognized, of accurate observation of nature as a basis of painting. But artists were not the only people he aided—all his readers were helped to a clearer perception of the beauties of the world about them. His prose is unsurpassed in its word painting, and in its melody approaches poetry. Most important of all, he helped men to realize that "free-heartedness and graciousness, and undisturbed trust, and requited love, and the sight of the peace of others and ministry to their pain—these and the blue sky above you, and the sweet waters and flowers of the earth beneath, and mysteries and presences innumerable of living things" are the substance of wealth and the objects of labor. A.MC C.

Consult Benson's *Ruskin: A Study in Personality;* Harrison's *John Ruskin,* in English Men of Letters Series.

RUSSELL, *rus' el,* Lord John, First Earl Russell (1792-1878), an English statesman, twice Prime Minister. He was the third son of the Duke of Bedford, was born in London and educated at Westminster School and the University of Edinburgh. In 1813 he was elected to Parliament and from the first showed himself an ardent advocate of Parliamentary reform. Catholic emancipation and the repeal of the Test Act also enlisted his efforts, and when, in 1830, Earl Grey became Premier on a platform of Parliamentary reform, Lord John was made paymaster-general. With the passage of the Reform Bill of 1832 he was intimately associated. From 1835 to 1839 he was home secretary, and when Peel went out of office, in 1846, Lord John Russell became Premier.

He remained in this office until 1852, and his most effective work was the quieting of the turmoil in Ireland. His administration saw, too, the agitation known as Chartism and the unsuccessful attempt of the Roman Catholic Church to reëstablish itself in England. Defeated in 1852, Lord John served from December of that year to 1855 as foreign secretary, and in the latter year represented England at the conference of Vienna. As foreign secretary under Lord Palmerston, he showed hearty sympathy for the Italians in their efforts toward union, and according to his critics violated British neutrality during the American War of Secession by his attitude on the Alabama question and the Trent affair. In 1865 he again became Prime Minister, but resigned the next year because of the defeat of a reform bill. The remainder of his life was spent in literary pursuits. He was raised to the earldom seventeen years before his death.

RUSSELL, John Scott (1808-1882), a Scottish engineer, born near Glasgow. His father, a clergyman, had destined his son for the ministry, but yielded before the decided talent for science which the boy showed. After studying at the universities of Saint Andrews, Edinburgh, and Glasgow, and doing some practical work in the shops, Russell began to lecture in Edinburgh on science. In 1832-1833 he filled the chair of natural philosophy at the University of Edinburgh, and the next year began his noteworthy studies of wave motions, which resulted in his proposal of a new system of shaping vessels. He himself built after his new system the *Great Eastern,* with which the Atlantic cable was laid, and the *Warrior,* the first sea-going armored frigate. He wrote various papers on naval architecture, and the *Wave of Translation,* which was published after his death.

RUSSELL, Sol Smith (1848-1902), an American actor who became famous as an impersonator and comedian. His name is most often associated with the play *A Poor Relation,* in which his best acting was shown. He was born in Brunswick, Me., and at the beginning of the War of Secession he joined the Federal army as drummer boy. In 1862 he left the troops to play the drum, act and sing in a small theater in Cairo, Ill. In 1874 Smith became a member of the Augustin Daly organization and made his first stellar appearance in 1880 in *Edgewood Folks,* presented over 1,500 times. He played best the parts which combined the whimsical and the gentle, and he found an excellent vehicle for his peculiar talents in *Peaceful Valley* and in *A Poor Relation,* both of which were written especially for him.

RUSSELL SAGE FOUNDATION, an institution established by the widow of Russell Sage, by which $10,000,000 of the great fortune left by him has been dedicated to the highest social uses. The Sage Foundation was established in 1907, with the endowment named above, "for the improvement of social and living conditions in the United States of America." But it does not seek to improve conditions merely by relieving poverty and distress; it is ambitious to remove the causes which result in poverty. It aims to open the way for people to earn a living wage, to occupy sanitary homes, to eat wholesome food, to live clean lives, to bring up sturdy, wholesome children.

In order to accomplish its aims the Foundation is divided into a number of organizations. It has a charity organization whose sole purpose it is to increase the efficiency of other charities. It has a department which promotes improved methods of dealing with dependent, defective, neglected and delinquent children. It has a child hygiene department, which aims to promote the physical and mental progress of children by providing them with playgrounds, sports, etc. There is a committee on the prevention of blindness and a committee for improving the methods and efficiency of loan associations. Its most conspicuous branch is probably the Russell Sage Foundation Homes Company, which has built at Forest Hills Gardens, on Long Island, near New York City, a group of the most attractive and convenient homes possible for a small amount of money. These houses are rented to people with moderate incomes. The headquarters of the Foundation are in New York City. See Sage, Russell, subhead *Margaret Olivia Slocum Sage.*

RUSSIA, until 1917 a European and Asiatic empire including in its boundaries one-sixth of the land and one-twelfth of the people of the earth, and the one whose government for many years was the most conspicuous example of absolute despotism, excepting, possibly, Turkey. Its rulers for over 300 years were oppressors of their subjects and disbelievers in freedom of speech, popular government and education of the masses. Yet the democratic ideals that have wrought such great changes in the world were kept alive in the downtrodden country by heroic men and women, thousands of whom suffered exile in Siberia for their faith, and in 1917 the people deposed their czar. Russia is now in the throes of reconstruction, with the Bolsheviki in control.

Old Russia extended from the Baltic on the west to the Pacific Ocean on the east, and from the Arctic Ocean on the north to the Turkish dominions, Persia, Afghanistan, India and China on the south. Its greatest extent from east to west was 7,000 miles, or more than twice the distance from New York to San Francisco. Its extreme northern and southern points were 2,400 miles apart. The area of this vast country was

8,764,585 square miles. It was over twice as large as Canada, and also more than twice as large as the United States, exclusive of Alaska. Excluding Eastern Siberia, the entire region is one vast plain, broken only by the Ural Mountains. Excepting along a portion of its western boundary, Russia is separated from adjoining countries by natural barriers.

Russia was divided into many provinces, and within its domains were found numerous races and nationalities. The following table gives the area of the largest political divisions and their population, according to statistics of 1914:

PROVINCE	AREA IN SQUARE MILES	POPULATION
European Russia	1,867,737	128,864,300
Poland	43,804	12,247,600
Caucasus	181,173	12,921,700
Siberia	4,831,882	10,000,700
Central Asia Provinces	1,366,832	11,103,500
Finland	125,689	3,241,000
Water	347,468	.....
Total	8,764,585	178,378,800

All Russia as it existed before the War of the Nations was divided into Russia in Europe and Russia in Asia. Russia in Europe occupied over half the continent, and for administrative purposes was divided into governments, provinces and territories. Petrograd, the capital, was the residence of the czar. The revolution brought with it a breaking up of the political structure of the country, as various districts announced their establishment as independent nations (see *History,* below).

The People of Russia. Of the 178,000,000 people in all Russia, about 129,000,000 are found in European Russia. Three-fourths of these are Slavs, or true Russians, who are divided into three branches—the Great Russians, the Little Russians and the White Russians. The Great Russians number about 65,000,000. They occupy all of the central part of the country and constitute about three-fourths of the population in the eastern and northern sections. The Little Russians, also known as Ruthenians, or Ukrainians, numbering about 20,000,000, are settled in the southeastern part of the country. The Cossacks (which see) have the same speech as the Little Russians. The White Russians occupy four governments, or provinces, in the west. There are also about 6,000,000 Russians in the Asiatic provinces.

In the northwestern provinces of Finland and Lapland there are about 3,500,000 Finns, and at the outbreak of the War of the Nations 2,000,000 Germans were living in the provinces bordering on the Baltic. The Jews, of whom there are over 5,000,000, are most numerous in the southwest and west and in Poland. Russia has more Jews than any other country—more than half of the number in the world. The region between the Black and Caspian seas, known as the Caucasus, is peopled by Armenians, Kurds, Persians and other tribes. There are about 5,000,000 Turco-Tatars in the country, and 3,500,000 Lithuanians. Asiatic Russia contains Mongols, Kalmucks and many other native tribes.

Religion. Under the empire the state religion was the Greco-Russian, or Orthodox Catholic. Until the revolution of 1917 the czar was the head of the Church. The Holy Synod was the governing board, and the procurator, its chief officer, had very large powers. The principal churches and monasteries in Russia possessed rich stores of vestments, some of comparatively high antiquity, which were preserved with scrupulous care and used on ceremonial occasions. In 1914 the Orthodox Catholics numbered over 87,123,600; Dissenters, about 2,204,000; Roman Catholics, 11,500,000; Protestants, 5,030,000; Jews, 5,450,000; Mohammedans, 13,907,000. The established Church has had no official standing since the Bolsheviki took control.

Physical Features, Plants and Animals

Surface. The description which follows applies to Russia as it appeared on maps made before 1917. Russia in Europe includes the western portion of the great plain that extends eastward to the Bering Sea, broken only by the low range of the Ural Mountains. The plain is not absolutely level. There are low hills, or undulations, and stretches of broken country, but no point has an altitude exceeding 1,400 feet. The general level of this plain in Europe is from 400 to 600 feet. In the interior there are heights of land extending in a north and south direction. One, known as the Valdai Hills, separates the plains bordering on the Baltic from the low country of the Upper Volga region. Its highest point is about 1,200 feet. The Heights of the Volga extend along the right (west) bank of that river from Nizhni Novgorod to Tsaritsin, a distance of 730 miles, and reach an altitude of over 1,300 feet. In the southeast is the largest area in the world below sea level, the basin of the Caspian, whose waters are ninety-six feet below the Mediterranean.

The Ural Mountains, forming a part of the boundary between Russia and Siberia, are low mountains whose highest peaks do not exceed 5,000 feet, and are broken by cross valleys into three sections, known respectively as the Northern, Central and Southern Urals. These and the Yaila Mountains, on the south coast of the Crimea, are the only mountains in Russia proper, but in the Caucasus, extending between the Black and the Caspian seas, there is a range whose snow-capped peaks of 18,000 feet rival the Alps in grandeur.

LOCATION MAP
Russia in Europe occupies about half of that continent.

Rivers and Lakes. The river systems constitute a distinguishing feature of the great Russian plain, whose extent was favorable to the development of the largest rivers of Europe, excepting the Danube. Most of the streams have their sources about the central height of land, from which they flow in all directions. With few exceptions the rivers are deep, with slow currents and channels so completely worn that their waters are navigable for boats of light draft almost to their sources. According to their drainage the rivers are divided into the following systems: the Arctic Ocean and the Baltic, the Black and the Caspian Seas.

The Arctic system includes the rivers flowing into the Arctic Ocean and the White Sea. The most important of these are the Petchora, rising in the Ural Mountains; the Northern Dvina, noted for its volume of waters, and the Onega. The latter flows into the White Sea.

The Baltic system includes the Neva, the outlet of Lake Ladoga, a stream of great volume upon whose banks Petrograd is situated; the Düna, sometimes called the Western Dvina; the Vistula, flowing through Poland and having the Northern Bug for its principal tributary, and a number of smaller streams.

From west to east the principal rivers from Russia flowing into the Black Sea are the Dniester and the Bug, both of which are navigable; and the Dnieper, the second largest river of Russia, draining an area as large as France. The Don flows into the Sea of Azov, an arm of the Black Sea. Its chief tributary is the Donetz.

The chief river flowing into the Caspian Sea is the Volga, the largest river of Europe, called in national songs *Mother Volga.* Another river emptying into this sea is the Ural, whose shallow waters contain an abundance of fish. The Oka and the Kama are tributaries of the Volga.

There are thousands of lakes in Finland and the other provinces bordering on the Baltic. Lake Ladoga, the largest, has an area of 7,000 square miles and is about the size of Lake Ontario. Lake Onega, about one-half as large, is the second in size, and Lake Peipus is third. Many of the lakes are connected by streams, and in the far north some of them blend with the marshes of the lowlands.

Climate. The surface of Russia is reflected in its climate. From the great extent of the country one would expect to find marked differences and sudden weather changes, yet this is not the case. The absence of lofty highlands and the southerly slope of the principal watersheds so modify the differences in latitude that in traveling from one portion of Russia to another they are scarcely noticeable. The Arctic Ocean exerts some influence over the climate of the extreme north, but the Baltic and the Black seas are too small to affect so large a plain. The climate is therefore continental; that is, the winters are cold and the summers warm. The difference between the mean summer and winter temperature amounts to 40° F. in some parts and to 63° in others, the difference increasing from south to north, at the rate of about 9.7° F. for each degree of latitude. From west to east the difference in temperature is more marked. The temperate winds from Western Europe raise the mean temperature of the western part of the country, but the southeast winds from Asia are cold and raw. There is, of course, a marked difference between the region bordering on the Arctic Ocean and that around the Black Sea. The former lies within the Arctic zone and is in the grip of ice and snow for about eight months each year; the latter lies in the warm temperate region, where the grape and the olive thrive. The transition from one extreme to the other, however, is gradual. The average temperature of Petrograd is 15° F. for winter and 64° for summer, and the temperature at Odessa is about the same as that of Boston.

The rainfall is less than that required for agriculture in the United States. It decreases from the northwest to the southeast. It is eighteen inches at Petrograd, fourteen inches at Kazan and 4.8 at Astrakhan. A heavy mantle of snow covers the entire country during the winter, and contributes immeasurably to the fertility of the soil.

In Petrograd the longest day lasts eighteen hours and forty-five minutes. For two months, during the long winter, there is practically no

sunlight. In the southern part of the country the length of day and night corresponds to that in the northern half of the United States for the same season of the year.

Plants. The Arctic zone of vegetation, whose southern boundary practically coincides with the Arctic Circle, consists of the tundra (which see), and this is frozen a large portion of the year. Here the plants consist chiefly of mosses and lichens, a few hardy shrubs, and, in places where humus has accumulated, flowering plants which can withstand the severity of the climate. South of this is the great belt of evergreen or coniferous forests, which extends southward to an irregular line drawn from the Gulf of Finland to the southern end of the Ural Mountains. To the south and west is the hardwood forest, which blends on its southern and eastern border with the grassy plains or steppes that occupy the southeastern portion of the country.

The larch, silver fir, birch and other trees characteristic of a subarctic climate are found in the northern part of the forest belt. This border gradually merges into the grand forest of magnificent evergreen trees, in which pine and fir predominate. Forest areas separated by impassable marshes, dense thickets and numerous lakes are the leading features of this region.

The hardwood forest, or oak region, as it is sometimes called, occupies all of Central Russia, and is characterized by a rolling surface and forests of oak, birch and other hardwood trees interspersed in sandy places with Scotch pine. The forests are separated by open spaces occupied by farms and villages, imparting to the landscape a pleasing variety of woodland and meadow.

In their native condition the steppes were covered by a luxuriant growth of wild grass and flowers. Such trees as the wild cherry and wild apricot are found on the slopes bordering streams, and thickets of willows are found in the depressions. However, nearly all this region has been changed by cultivation and fertile fields and green pastures are seen on every hand.

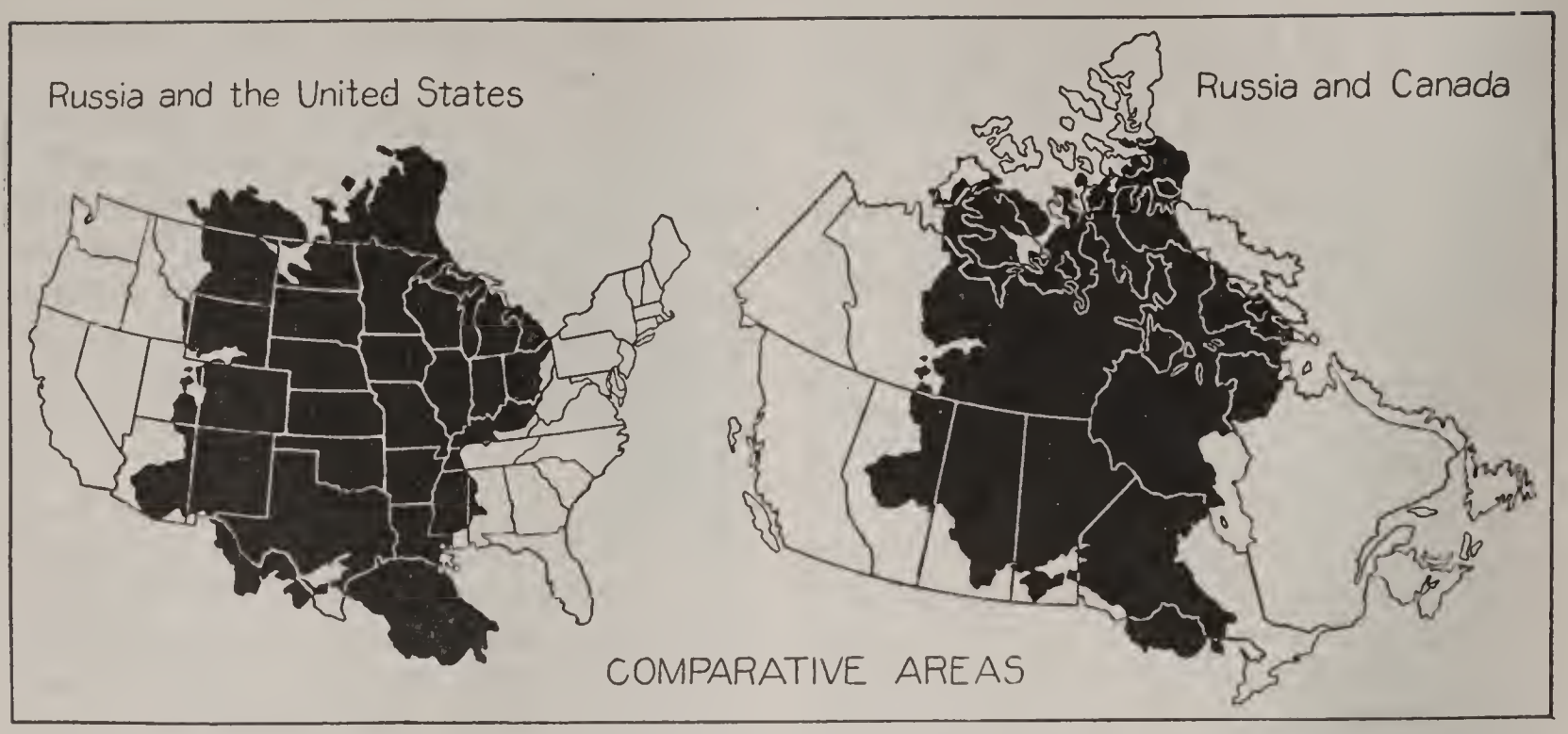
Animals. In the region within the Arctic Circle the seal, the polar bear and the reindeer are found. The great forest south of this region is the home of many fur-bearing animals, although some of the most valuable species have been nearly exterminated by hunters. Here are found bears, wolves, foxes, the elk and various species of deer, the wild boar and the glutton. In the more open forests of the central part of the country, squirrels, hares and many other small animals occur in large numbers. The agricultural region contains a number of animals of the marmot family, which, because of their destruction of crops, are pests. During summer the fields and forests of the entire country are enlivened by the flight and song of birds common to the cool temperate regions of Europe and North America. In the north thousands of wild geese, ducks and other water fowl frequent the marshes during the nesting season. The lakes and rivers abound in fish, and the Russian farmer, like farmers in other temperate regions, suffers yearly losses from insect pests.

Sources of Russia's Wealth

Minerals and Mining. The country has great mineral wealth, but owing to the scarcity of fuel and lack of transportation facilities mining has not until recently been developed as rapidly as in other parts of Europe. However, after 1900, the coal and iron industries achieved rapid progress, owing largely to investments by French and Belgian capitalists and the introduction of modern, scientific methods of mining and smelting. The chief mining regions are the Ural Mountains; the government of Ekaterinoslav, north of the Sea of Azov; the province of the Don Cossacks, east of Ekaterinoslav; Baku, in the extreme southeast, and the Donetz coal region in Poland. Since the revolution, Russian Poland has been incorporated with Austrian and German Poland in an independent Polish republic (see POLAND).

The Ural Mountains are the great source of platinum, and over nine-tenths of the world's supply comes from them. The most important coal mines are in the Donetz basin, and iron is obtained chiefly from the southern provinces. In 1914 Russia was producing three-fourths of the coal, four-fifths of the pig iron and practically all the steel used in the country. Copper is obtained in the Ural Mountains and in the Caucasus, where an attempt is being made to set up a state independent of Russia. Baku contains one of the largest oil fields in the world, but the future ownership of these wells is a matter of uncertainty.

Fisheries. The waters on the northwest coast and the rivers and lakes abound in the best varieties of food fish, including cod, salmon, sturgeon and other varieties. The northwest



EUROPEAN RUSSIA AND THE UNITED STATES AND CANADA COMPARED
If Siberia were added to the black area the vast combined sweep of Russia would be over twice as great as the area of either of the great American democracies.

coast and the Caspian Sea and rivers flowing into it are the chief sources of the industry, and the annual catch from all sources amounts to over 1,500,000,000 pounds.

Agriculture. Agriculture is the chief occupation of about seven-eighths of the population of European Russia. The variation in temperature and rainfall over so wide an extent of territory makes a variety of agricultural interests necessary. In the extreme north agriculture cannot be practiced, but elsewhere crops can be grown. In the region of the great forest there are but few farms, but throughout the great area south of an east and west line passing through Petrograd most of the land not forested is under tillage. In the southeast is the great black-earth region, constituting one of the greatest wheat countries in the world. It is from this region that Russia exported under ordinary conditions about 100,000,000 bushels of wheat each year, making it second only to the United States as a wheat-exporting country.

Next to wheat the most important crops are rye, barley, sugar beets, flax and potatoes. Russia formerly raised more than one-half the rye grown in Europe, and it produced more barley than the United States.

Before the war the live-stock industry was especially profitable in the south, where the animals go without shelter throughout the year. Russia produced in normal times more and better horses than any other country in Europe. It had more swine than any other European country except Germany, and large numbers of cattle, sheep and goats. After the revolution all lines of agriculture declined.

Until recently the land was all in large estates; these were rented in small divisions to peasants who live in community villages, or *mirs*. The proprietors have never resided upon the land, and the methods practiced by the tenants have been wasteful in the extreme. American machinery and implements have been introduced to a considerable extent into the black-earth region, and these have had their influence in improving methods of tillage and harvesting, but elsewhere throughout the country primitive methods and implements long since out of date are employed. In 1906 a new land law became effective whereby large areas of land were to pass into the hands of peasant proprietors. This movement was encouraged by the peasant land bank, which extended to the purchasers loans on easy terms of payment. Since the revolution the peasants have taken over all the land, and the old agrarian system has been abolished. Because of lack of tools, implements, seed, fertilizer, etc., and the breakdown of transportation, production in Russia is far below normal. The richest grain section, the Ukraine, is in a state of turmoil, owing to conflicts between Bolshevik and anti-Bolshevik factions.

Forests. Russia has the most extensive forests of any country except Canada, and the felling and shipping of timber formerly provided a comfortable living for a large number of people. During the winter thousands who would otherwise be idle worked in the forests. Wood is the chief fuel; coal is beyond the means of the peasants. Little or no attention is given to the preservation of forests, and the

wasteful methods of cutting timber now practiced will soon deforest large areas. In the pine forests, for example, trees without number are felled for the purpose of making tar and turpentine. In other regions they are ruthlessly destroyed for making potash. The timber exported was formerly valued at about $86,000,000 a year.

THE BLACK-EARTH BELT

This "granary of Russia," which extends across Southern Russia, is one of the most fertile as well as one of the most extensive arable plains on the globe. It owes its name to a layer of blackish humus, varying in thickness on the average from one foot and a half to five feet.

This black-mold belt stretches in one long band across the whole of European Russia. Notwithstanding its faulty cultivation, this region, like the Mississippi Valley, is one of the world's immense storehouses of grain.

Manufactures. Manufactures were stimulated by a high protective tariff on imports and by the abundance and variety of raw material. Nevertheless, the manufacturing industries were far behind those of the countries of Western Europe. The factory system common to Germany, England and America was almost unknown. With the exception of the iron and steel industry, nearly all manufacturing was carried on in small shops and mills, many of which were located in the country; besides, thousands of the peasants were engaged a portion of the year in their own homes in the manufacture of such articles as hats, household utensils, linen and woolen goods and leather. The majority of the people who worked in these establishments engaged in farming in summer.

When the Bolshevik régime began, existing factories were removed from private ownership, and an attempt was made to place the control of all industries in the hands of the workingmen. Because of the lack of raw materials, a disorganized railroad system, civil war and the turmoil accompanying so radical a change, Russian manufacturing after 1917 became demoralized and production was greatly curtailed.

Commerce. Commercially, Russia formed the connecting link between Asia and Europe. To the countries of Western Asia it was a source of supply of manufactured products; to those of Western Europe it furnished agricultural products and raw material for manufactures. Because of lack of facilities for travel and transportation, the old method of exchanging products at fairs is still followed to a considerable extent, and it is estimated that at least 16,000 fairs used to be held in the Russian dominions each year. Nizhni Novgorod was for several centuries the location of the most noted of these gatherings. Each large city has wholesale houses, and some of them did an extensive business. Local trade is carried on chiefly in small shops (see FAIR; NIZHNI NOVGOROD).

Transportation. During all the centuries of its existence the rivers of Russia have been the great highways of commerce and civilization. It was down the Dnieper that the fleets descended against Constantinople and brought Greek civilization to Kiev. The Dnieper made Russia Byzantine, the Volga made it Asiatic, and the Neva made it European. Nearly all the navigable rivers are connected by canals, and boats can pass from the Caspian and the Black seas to the Baltic. The Black and the Caspian seas are also connected by waterways, as are the Baltic and the White seas. Although the rivers and canals are closed by ice from a fourth to a half of the year, fully one-third of the freight is transported by water. The total navigable mileage of rivers and canals in European Russia, exclusive of Finland, is 153,780 miles. Of this mileage, 20,670 miles are navigable for steamers. The most important seaports are Archangel, on the White Sea; Petrograd, on the Neva; Riga, on the Baltic; Odessa, on the Black Sea, and Astrakhan, on the Caspian.

European Russia has 36,000 miles of railway, and Asiatic Russia about 11,000 miles; in Russia proper rolling stock and equipment are badly out of repair. Moscow is the chief railway center, and the southern half of the country has very good railway facilities, although in construction and equipment the Russian railways are inferior to those of America. The Trans-Siberian Railway (which see) is one of the most extensive systems in the world. In 1918 it was taken over by the allies, who undertook to put it into good condition.

The country roads in summer are poor, but during the winter they are greatly improved by the snow.

Social and Political Conditions

Society in General. Many conditions have combined to prevent civilization in Russia from advancing as rapidly as it has in the countries of Western Europe. Chief among these causes are the extent of the country, with a consequent diversity of interests; the great number of races represented in the population; a land system which has been exceedingly oppressive to the common people, and a bureaucracy which has administered the government in its own interests. Russian society may be divided into three classes: the aristocracy, which until 1917 held almost absolute sway over the nation; the great middle class, including professional men, merchants and other business men and those peasants who have acquired wealth and obtained education; and the ordinary peasantry, constituting by far the largest part of the population, the majority of whom have long lived in extreme poverty and ignorance.

The assimilation of these classes and the direction of their united energies to a great national purpose is a task requiring not years or decades, but at least a century. But, notwithstanding these great obstacles, many of the Russian people in the large cities made wonderful progress in education, literature, science and art, and their scientific and literary organizations, museums and art galleries compare favorably with those of other European countries.

As a whole, the Russian people are sentimental, poetical, truthful, superstitious and satisfied to live modestly and simply. They possess wonderful patience and endurance under hardship. They are not understood by those who have not lived in the country and are frequently misrepresented and called an inferior race, a supposition disproved by the achievements of their great men in literature and science, and by the steady advancement of the nation towards a greater freedom.

Education. The people of Russia, like those under every other despotic government, have had their struggle for better education. While the wealthy classes enjoyed the greatest privileges of education, the masses were kept in ignorance. For a century military and theological schools were the only institutions of higher education that were well patronized or that received government aid. They were respectively under the direction of the Minister of War and the Holy Synod. A system of primary schools secured a much larger attendance of pupils and proportionately extending its influence, and the schools contained several excellent features. In many villages a garden or field in which the pupils were taught practical agriculture was connected with the school. In 1914 there were ten universities, with a total enrollment of 40,000 students. There were also a number of secondary, technical and special schools and there were more than 8,000,000 pupils in the elementary schools. One of the encouraging features of the 1917 revolution was the interest shown in education by those who formerly were kept in ignorance, and a complete system of public education was established by the Bolshevik government.

Government. Previous to the revolution of 1917 the government of Russia was aptly characterized as "a constitutional monarchy under an autocratic czar." Until October 30, 1905, Russia was an absolute monarchy with the supreme authority vested in the czar. He was assisted by a Council of Ministers, known as the Council of the Empire. The members of this Council were appointed by the czar and were responsible to him only. In 1905 a constitution providing for an elective assembly was granted (see DUMA). The Council of the Empire was made the Upper House of the Parliament, and the Duma, the Lower House. The czar held the power to dissolve the Duma at his pleasure, and the first assembly was promptly dissolved because of criticism of the acts of the government. Partial local self-government was provided through the zemstvo (which see).

The New Government. After the czar was deposed an attempt was made to establish a Socialistic republic under the leadership of Alexander Kerensky. The radical faction, headed by Nikolai Lenine, succeeded in overturning the Kerensky régime in November, 1917, and a soviet republic was established. *Soviet* means about the same as *committee.* The plan of government is as follows: Every Russian workman and peasant is entitled to vote for representatives in his local soviet, the number varying according to the size of the electorate. The local soviets are authorized to choose delegates to the All-Russian Assembly of Soviets, which in turn select the Central Executive Committee. The latter passes all acts of importance, which are issued as laws by the Council of People's Commissaries. The term of the Executive Committee lasts only to the next meeting of the Assembly, which passes upon its acts and those of the People's Commis-

saries, and elects a new Executive Committee. The Bolsheviks claim that this system brings the people into the closest possible relation with the government. They admit that they exclude the privileged classes from voting or participating in affairs, and state that they are endeavoring to wipe out the middle and upper classes in order to destroy the entire system of privilege and exploitation. They are frankly against all capitalistic governments.

History of Russia

The Early Period. The earliest history of Russia consists of legends. These tell us that in the middle of the ninth century the Slavs and Finnish tribes inhabited the forest region around Lake Ilmen, between Lake Ladoga and the upper waters of the Dnieper. In 859, because of dissension, these tribes invited the Scandinavians, under their leader, Kurik, to enter the country, assume rule over it and protect it from invasion by other tribes. The beginning of Kurik's rule marks the date of the foundation of the Russian Empire. He died in 879, and Oleg, a member of his family, was made regent for Kurik's son, and by him the capital of the country was removed to Kiev. At the beginning of the twelfth century the Russian Slavs occupied scarcely one-fifth of European Russia. The history of the country for the four following centuries was one of war, rebellion and intrigue, during which the Russian people increased in numbers and extended their domain.

Beginning of Modern Russia. Previous to the Romanoff dynasty, which began with Michael Feodorovitch (1613-1645), the Russian rulers were of very little interest to history. Russia's progress as a nation began with the reign of Peter the Great, the "Father of Modern Russia." He introduced into the government many of the ideas and methods of the more progressive nations of Western Europe, founded Saint Petersburg (now Petrograd), inaugurated shipbuilding and advanced other industries, and in many ways welded his vast domain into a strong, centralized power. Some of Peter's ideas were strenuously opposed by the nobility, and for a brief period after his death the movements he had commenced languished. However, under Catharine II (1762-1796) Russia again made rapid advancement in civilization and was fully recognized as a great power. It was during her reign that Poland was partitioned, and 180,000 square miles of territory with 6,000,000 inhabitants were added to Russia. Two successful wars were waged against the Turks, who were compelled to release their control over Crimea and other possessions in what is now Southern Russia. Under Alexander I serfdom was abolished in the Baltic provinces (see SERFS), and a number of improvements in the government were made. He joined Austria against Napoleon, but their combined armies were defeated at Austerlitz (which see). Later Alexander entered into an agreement with Napoleon whereby he acquired Finland and the Aland Islands from Sweden, and compelled Turkey to cede to Russia the territory between the Dniester and the Pruth. In 1812, however, Alexander joined the alliance against Napoleon, whose overthrow he was largely influential in accomplishing. At the Congress of Vienna which followed, the Duchy of Warsaw was ceded to Poland, which was under control of Russia.

At the beginning of Alexander's reign the people were led to hope for a more liberal policy on the part of the government, and for some relief from the oppression they had endured under his predecessor. Their hopes were not realized, and a rebellion broke out when his successor, Nicholas I, ascended the throne in 1825. During the reign of Nicholas I Russia extended its dominions in Asia, and began the conquest of the Caucasus. In 1853 Nicholas began a war against Turkey which led to the interference of France and Great Britain, by whose influence Russia was compelled to relinquish most of the advantage it had gained through its victories.

Abolition of Serfdom. Alexander II was noted for his abolition of serfdom throughout the Empire in 1861, thereby setting free more than 20,000,000 men. A state system of loans was also provided, whereby many of the freed men were able to purchase small farms. In 1864 the zemstvos were instituted. But notwithstanding these reforms there was a growing spirit of revolution throughout the country. This led to the increase of government espionage and the issuing of orders which restricted the freedom of speech and of the press. Many political suspects were arrested and transported to Siberia. In 1877 war was again declared against Turkey and vigorously prosecuted. In less than a year the Russian forces had advanced almost to Constantinople, when the

other European powers intervened and again deprived Russia of its long-coveted prize, a southern outlet to the sea. On March 13, 1881, Alexander II was assassinated in Saint Petersburg by revolutionary conspirators.

Alexander III, who succeeded to the throne in 1881, was noted for his extreme reactionary policy. During his reign Russian dominions in Asia were extended; the persecution of the Jews became so cruel as to call for protests from other nations; the Trans-Siberian Railway was begun, and an alliance was formed with France which has continued to the present time.

Recent History. Alexander III died in 1894 and was succeeded by his son, Nicholas II, who was deposed in 1917. The new czar had traveled extensively in his Asiatic dominions and was thoroughly acquainted with the needs and possibilities of this part of the Empire. The Trans-Siberian Railway was completed, and other important lines in Asia were constructed. At the close of the war between China and Japan in 1895 Russia secured from China the lease of Kwang-tung Peninsula for twenty-five years. This was erected into a province, the port of Dalny was opened, and a strong naval station was established at Port Arthur.

Another treaty with China provided for the construction of the Manchurian Railway, and under pretense of guarding the railway Russia assumed military occupation of Manchuria. These measures had been strenuously opposed by Japan, and in 1904 that country declared war against Russia. In the brief conflict, which lasted about a year, Russia was disastrously defeated, chiefly because of lack of preparation and the long distance of the seat of war from the center of government.

But of far greater significance than the war were the social and political movements within the Empire to which the war gave a strong incentive. For more than a century there had been almost constant friction between the aristocracy and the people, and during the last half of that century the zemstvos had been educating the people in democracy. The strained relations occasionally led to riots and attempts at revolution. These disturbances were quelled by the police or the army, and the leaders were usually executed; nevertheless, the spirit of democracy continued to increase.

The most intelligent classes realized that Russia's defeat in the war with Japan was the result of the inefficiency and corruption of the bureaucracy, which the czar was unable and apparently unwilling to control. In addition to this, the government had refused to grant relief from an intolerable land system, under which thousands of people were starving in a land whose crops were feeding the nations of Western Europe. Moreover, the great railways within the Empire had been built with foreign capital, and foreign capital had also found that certain Russian industries offered a desirable field for investment. With the introduction of foreign capital came a limited number of men—engineers, superintendents and skilled workmen—and from these men the Russian peasant learned of the conditions of the laboring classes in other countries. Comparison of these conditions with his own increased his discontent.

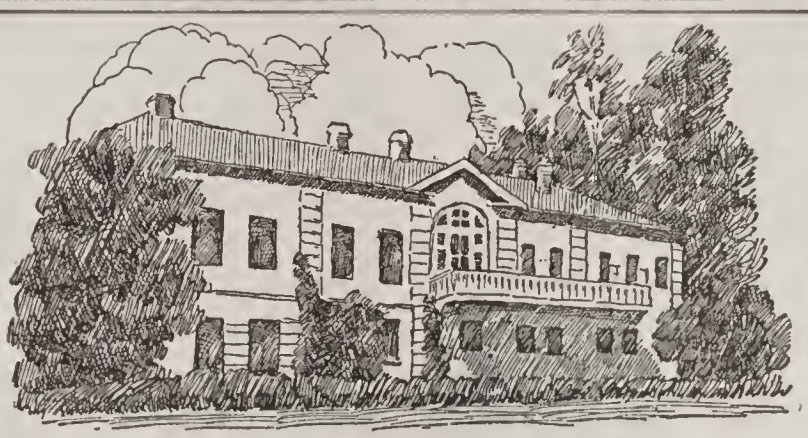
Within the government were two factions—the extreme conservatives, who were constantly advocating more drastic measures of repression; and the liberals, who counseled moderation and advised the czar to yield to the most urgent requests of the people. The conservative faction was in control, and petition after petition was denied until the tension between the government and the people reached the breaking point. Then came the revolution of 1905, inaugurated by a series of great strikes. In an attempt to break the strike in Saint Petersburg over 500 innocent people, many of them women and children, were killed, and over 3,000 were wounded by the police and the soldiers. The best political authorities of Russia agree that by this act the government separated itself from the people beyond all possibility of reconciliation.

The ruling power finally realized that it was unable to control the situation by repressive measures, so the czar granted a constitution providing for a national assembly elected by the people. Such restrictions, however, were thrown about the Duma that it could accomplish little in the way of direct legislation. The czar reserved the power to dissolve it at will, a power which he promptly exercised whenever the assembly acted contrary to the wishes of the bureaucracy. The first Duma met May 10, 1906. It recommended universal suffrage, the abolishing of the Council of the Empire and a reform in the land laws. The Duma was dissolved July 22. While successive Dumas were unable to enact legislation of importance, the influence of this great national assembly continued to increase throughout the Empire, and the oppressive measures of the bureaucracy met with more strenuous opposition from year

RUSSIA

The Kremlin

Russian Soldier



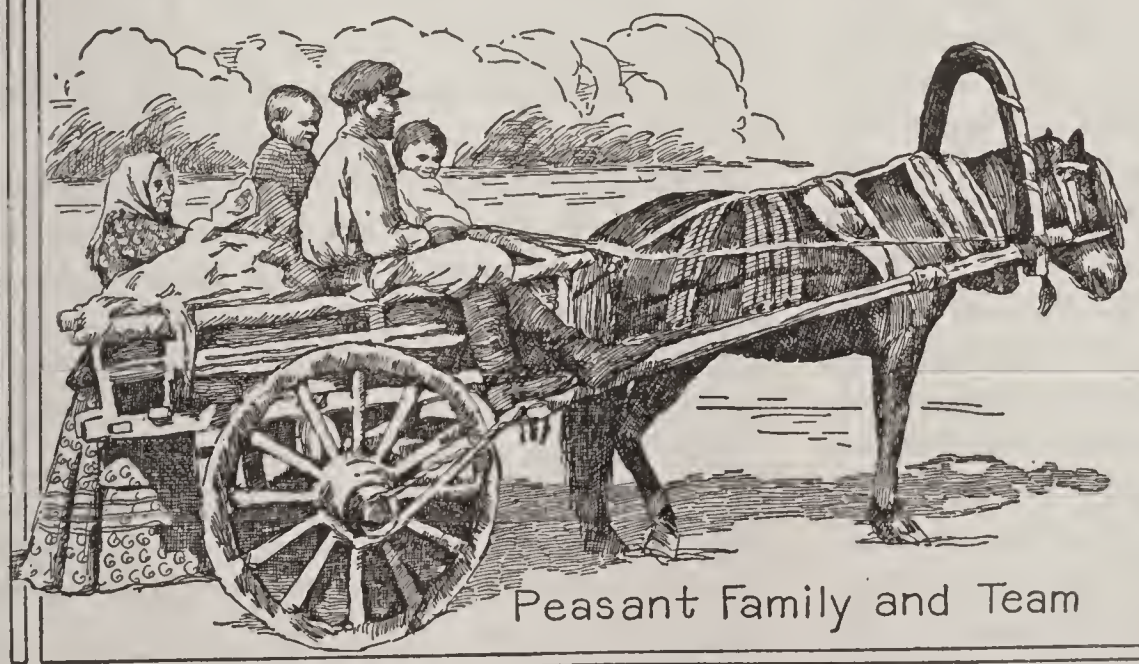
The Tolstoi Home

Petroleum Wells, Baku

Southern Siberian Travel

Saint Isaac's Cathedral, Petrograd

A Village Scene



Peasant Family and Team

A Peasant Type

to year. Democracy was increasing and bureaucracy was decreasing. Matters had almost reached a crisis when all factions were united by the entrance of Russia into the great European war. (For Russia's part in the war, see WAR OF THE NATIONS.)

The Revolution of 1917. On Monday, March 12, 1917, Michael Rodzianko, president of the Duma, telegraphed the czar, "The hour has struck; the will of the people must prevail." The most remarkable revolution of modern times, if not of history, was on. Within the next four days the czar was compelled to abdicate, the Ministers connected with the old régime were deposed, and some of them were imprisoned, and the government of all Russia came under the control of the Duma and a responsible Ministry. All this was accomplished with so little loss of life that the movement was styled "the bloodless revolution."

While the revolution came with the suddenness of a shock, it was the climax of many years of preparation characterized chiefly by the evolution of democracy. Possibly the most powerful influence in this evolution was the zemstvo. Strange as it may seem, the war brought to the people the fruition of their many years of waiting and struggle. In brief, the immediate steps leading to the revolution were the following:

At the beginning of the war the Duma pleaded for the united effort of all factions and agencies in carrying it forward, but the plea was not favorably received by the bureaucracy, whose acts were characterized by the usual delays and peculations. The zemstvos, realizing that united effort must be made to maintain the troops at the front, formed the All-Russian Zemstvos Union, of which Prince Lvoff, afterwards Prime Minister of the new government, was president. The organization included all the zemstvos of the Empire, and was a powerful factor in uniting the people in a common cause. The Municipal Union, the War Industry Committees and coöperative societies all joined with the Zemstvos Union in working for the success of the army. Up to October, 1916, these organizations had established more than 3,000 military hospitals; had furnished food for 300,000 laborers engaged behind the trenches; had provided fifty hospital trains for the transportation of sick and wounded soldiers; had supplied the armies in the field with 3,000,000 tents and more than 35,000,000 articles of clothing, besides contributing in many other ways to the comfort and support of the troops. As the war progressed these organizations increased in extent and influence. In other words, the war showed the Russian people what they could do and gave them much-needed confidence in themselves and in their zemstvos.

When the great Russian drive of 1915 was followed by the retirement of the army from the territory it had conquered, the people began to inquire into the causes. The influence of the czarina (a German princess) in the councils of the nation was looked upon unfavorably. Investigations showed that the Russian forces were not compelled to retire because there was not a sufficient supply of ammunition, as had been alleged, but because that ammunition and other supplies had been withheld by orders of the bureaucracy. Further investigation showed beyond doubt that the ruling faction in the Ministry was in sympathy with Germany, and that some of these Ministers were traitors. In 1917 Professor Milyukov in the Duma accused Prime Minister Stürmer of being a traitor to his country. The Minister was removed, but the czar issued a ukase suspending the Duma. Instead of obeying the ukase, the Duma compelled the czar to abdicate.

ALEXANDER KERENSKY

He was at the head of the provisional government from July to November, 1917. In spite of his democratic principles, ability as an orator and personal magnetism, he was unable to satisfy the radicals and was forced out of office.

Meantime the army had been recruited from the ranks of the common people and realized its dependence upon the people for its support. Consequently the army was ready to support the revolution, and without its support the movement could not have succeeded. Nicholas II abdicated in favor of his brother, the Grand Duke Michael, but the latter wisely announced that he would not ascend the throne unless he was elected to the position by the people. The people favored a republic, and the Grand Duke retired to obscurity.

The formation of a new and stable government was an extremely difficult undertaking. At first it was decided to intrust the chief power to the executive committee of the Duma and a Council, or Cabinet, of Ministers, and on March 15 the new Cabinet was announced. It was headed by Prince George E. Lvoff. At this time also was formed what was destined to be the most influential governing body in the country—the Petrograd Council of Workmen's and Soldiers' Delegates, and the Peasants' Delegates of all Russia. In June this body voted for the abolition of the Duma. The first Cabinet did not long survive because it was not a truly representative body. In the second Cabinet there were six Socialist leaders, and the most able of these proved to be Kerensky, who was made Minister of War and Marine.

The provisional government attempted to keep the nation in the war, and Kerensky departed for the battle front and inspired the armies to begin an offensive in the Austrian crownland of Galicia. After a promising start the movement was crushed, and the demoralized Russian troops were in full retreat by the latter part of July. At home, meantime, Nikolai Lenine, had attempted to overturn the government, but at this time his effort was unsuccessful. Kerensky became Premier on July 22, and for weeks struggled heroically against the disorganization in the army and the propaganda of Lenine's followers. These extreme revolutionists insisted on Russia's making peace with Germany as the first step toward the establishment of a truly representative government. They claimed that the mass of the common people were against continuing the war, and with the slogans, "Peace and land for the peasants" and "Peace and bread for the workmen," they succeeded in gaining control of affairs in November.

The name *Bolsheviki,* which means *those of the majority,* was originally adopted by the Leninites in 1905, when they split with the moderate faction of the Social Democratic party, an organization of industrial workers. The followers of Lenine were joined by the radicals of the peasants' revolutionary party, and the two united in November, 1917, under the name Bolsheviki. The establishment of the soviet republic (described above) followed, as well as the negotiation of a separate peace with Germany.

The All-Russian Congress of Workmen's and Soldiers' Delegates selected a new Cabinet on November 9, with Lenine as Premier and Leon Trotzky as Minister for Foreign Affairs. Lenine began at once to carry out his radical program, and Trotzky to reorganize the army for the protection of the revolution. Decrees were issued placing the workmen in control of the factories, private ownership of land was abolished, and mines, forests and waterways were taken over by the state. After an unsuccessful attempt to have the allies meet the Germans in a peace conference, Lenine sent envoys to Brest-Litovsk, who signed there, on March 3, 1918, a treaty which took from Russia one-thirtieth of its territory and one-fifth of its population. Russia agreed to relinquish its sovereignty over Esthonia, Livonia, Courland, Finland, Poland and the Ukraine, to release all German prisoners, and to pay huge indemnities. Germany was defeated in the autumn, and its program was smashed.

The soviet congress ratified the treaty in March in the city of Moscow, which had been selected as the Bolshevik seat of government. Russia had gained peace with Germany, but civil war was soon raging on all sides. An anti-Bolshevik faction in Siberia, aided by Czecho-Slovak troops, set up a so-called All-Russian government at Omsk, which the Lenin troops defeated. The demoralization of Russia was demonstrated in 1921 when famine swept great sections which normally produce great crops of grain; thousands of lives were sacrificed, though the outside world provided much food. In the fall of 1921 the bolshevik regime begged capital and the intellectuals to come to the rescue of the nation.

Consult Goodrich's *Russia in Europe and Asia;* Alexinsky's *Modern Russia:* Graham's *Russia and the World.*

Related Subjects. The following articles in these volumes will be of interest in connection with a study of Russia:

CITIES

Archangel
Astrakhan
Baku
Batum
Ekaterina
Helsingfors
Kazan
Kharkov
Kiev
Kishinev
Kovno
Kronstadt
Libau
Lodz
Minsk
Moscow
Nizhni Novgorod
Odessa
Orenburg
Petrograd
Reval
Riga
Saratov
Sebastopol
Tiflis
Vilna
Vladivostok
Warsaw

HISTORY

Austerlitz
Berlin, Congress of
Crimea, subhead *Crimean War*
Holy Alliance
Nihilists and Nihilism
Poland, subhead *History*

OUTLINE AND QUESTIONS ON RUSSIA

(Outline and questions refer, unless otherwise stated, to European Russia only.)

Outline

I. Location

(1) Of entire country, European and Asiatic
(2) Of European Russia, or Russia proper
  (a) Latitude (see map of Europe, following page 2092)
  (b) Longitude
  (c) Relation to other European nations
  (d) Advantages and disadvantages of its situation
  (e) Boundaries

II. Size

(1) Greatest east and west extent—1,850 miles
(2) Greatest north and south extent—2,250 miles
(3) Area

III. Surface Features

(1) Part of great plain of Europe
  (a) Greatest height 1,400 feet
  (b) Valdai Hills
  (c) Heights of the Volga
  (d) Caspian Sea basin
(2) Ural Mountains
(3) Caucasus Mountains

IV. Drainage

(1) Rivers
  (a) Arctic system
  (b) Baltic Sea system
  (c) Black Sea system
  (d) Caspian Sea system
    1. Mother Volga
(2) Lakes
  (a) Ladoga
  (b) Onega

V. Climate

(1) Differences in temperature due to latitude very gradual
(2) Effect of absence of lofty mountain ranges
(3) Continental climate
(4) Rainfall
(5) Length of days

VI. Plant and Animal Life

(1) Arctic zone of vegetation
(2) Evergreen forest belt
(3) Hardwood forest belt
(4) The steppes
(5) Fur-bearing animals
(6) Smaller animals
(7) Birds

VII. The People

(1) Races
(2) Classes of society
(3) Characteristic traits
(4) Education
(5) Religion

VIII. Resources and Industries

(1) Mining
  (a) Of iron and coal
  (b) Importance of platinum and manganese
  (c) Oil
  (d) Other minerals
(2) Fishing
(3) Agriculture
  (a) Chief occupation
  (b) System of landholding
  (c) Primitive methods
  (d) Chief crops
(4) Manufacturing
  (a) Effect of protective tariff
  (b) Absence of factory system
  (c) Chief articles manufactured

IX. Commerce and Transportation

(1) Russia as connecting link between Europe and Asia
(2) Effect of lack of transportation facilities
(3) Water transportation
(4) Railway mileage
(5) Roads

X. Government

(1) Historic phases
  (a) Autocracy
  (b) Establishment of Duma
(2) Government since revolution of 1917
(3) Local administration

XI. History

(1) Early years
(2) Establishment of modern Russia
(3) The Napoleonic period
(4) Continued autocracy
(5) Abolition of serfdom
(6) Russo-Turkish War
(7) Recent growth
(8) Russo-Japanese War
(9) Russia and the War of the Nations
(10) The revolution of 1917

Questions

Where is the largest area below sea level in the world? How much below sea level is it, on the average?

How does the heavy snowfall benefit Russia?

Where is Russia's great wheat-producing region?

If the United States had the same railway mileage in comparison with its area as Russia has, how many miles of railway would it have?

What were some of the obstacles which the builders of Saint Petersburg (Petrograd) had to overcome? About how many people died during the first year of construction?

By whom and to whom was the message, "The hour has struck; the will of the people must prevail" sent, and what effect did it have?

Of what great physical region of Europe does Russia form a part?

How do you account for the fact that the climate of Russia varies so gradually throughout the great north-and-south extent of the country?

How much does the mileage of navigable rivers and canals exceed the railway mileage of the country?

When did the first legislative assembly of Russia meet? What was it called? What limitations were placed upon its power?

What three "vital elements," claimed as inherent rights by every democratic people in the world, have always been denied to the Russian people?

Who are the Cossacks, and what are their dominant characteristics?

How does the number of Jews in Russia compare with the number in other countries? Can you see any geographic reason to account for this?

What is the "mother" river of Russia? How does this stream rank as to size among the rivers of Europe?

Why should Russia have larger rivers than any other country of Europe?

What distinction as to size has Russia's largest lake among the lakes of the continent? How does it compare in area with the largest North American lake?

How long is the longest summer day in Petrograd?

What are the "steppes," and how has the advance of civilization changed their appearance?

What valuable product besides timber do the great forests of Russia furnish?

How does the country rank in its ouput of the heaviest and most valuable of the ordinary metals?

What change has there been in the system of land tenure?

How many countries have a greater forest area than has Russia? How is a lack of appreciation of the value of forests shown?

How do methods of manufacture differ from those employed in most other countries of Europe?

How has Russia's geographic position made the country of importance commercially?

Who was the "father of modern Russia," and why did he deserve the name?

Who were the serfs, and when and by whom were they liberated?

When and by what body was the Duma abolished?

What slogans were used by the Bolsheviki to win the support of the people? What is the meaning of *Bolsheviki?*

Describe the soviet system.

What was Lenine's attitude toward the privileged classes?

Why did civil war follow the revolution?

Romanoff
Russo-Japanese War
Russo-Turkish Wars
Vienna, Congress of

The following biographies also contain much historical matter:

Alexander I, II and III
Catharine I and II
Ivan III and IV
Kuropatkin, Alexei Nikolayevitch
Mazeppa, Ivan Stefanovitch
Nicholas I
Nicholas II
Paul I
Peter I
Plehve, W. K. von
Witte, Sergei Yulievitch

LAKES

Ladoga
Onega

LEADING PRODUCTS

Barley
Caviar
Fish
Flax
Horse
Lumber
Manganese
Platinum
Rye
Sturgeon
Wheat

MOUNTAINS

Caucasus, subhead
Caucasus Mountains
Ural Mountains
Valdai Hills

PROVINCES AND DEPENDENCIES

Bessarabia
Bokhara
Caucasus
Circassia
Crimea
Finland
Georgia
Poland
Siberia

RIVERS

Dnieper
Dniester
Don
Neva
Ural
Vistula
Volga

UNCLASSIFIED

Cossacks
Kremlin
Ruthenians
Steppes

RUS'SO-JAPANESE, *jap an eez',* **WAR,** a struggle lasting from February, 1904, until September, 1905, through which Japan established its position among the nations as a first-class power, and became the dominant power in the Far East.

Underlying Causes. In 1895 Japan concluded a war with China (see CHINESE-JAPANESE WAR) in which the former country, by virtue of a complete victory, won the island of Formosa and the peninsula of Liao-tung (including Port Arthur). Russia, France and Germany, however, interfered, and forced Japan to cede Liao-tung back to China. Exhausted by the struggle, Japan was helpless to resist, but during the next decade the nation put forth every effort to prepare for the inevitable struggle with Russia, whose supremacy in Asia threatened the very existence of the island empire.

Russia owned Siberia, had obtained possession of the island of Sakhalin (see colored map accompanying the article ASIA), and had built a railroad joining Petrograd (then Saint Petersburg), on the west coast of Europe, with Vladivostok, on the east coast of Siberia (see TRANS-SIBERIAN RAILWAY). Moreover, after the close of the Chinese-Japanese War, Russia leased the Liao-tung peninsula from China and built a branch of the Trans-Siberian Railway through Manchuria to Port Arthur. In 1900 control of Manchuria was obtained. A lack of harbors free from ice the year round was the one great obstacle to Russia's commercial expansion, and when the government began to make plans to extend Russian influence in Korea, a land of good harbors, Japan felt called upon to act.

The reasons are not hard to find. The shore of the island Empire was almost within gunshot of the Korean coast, and Russia's occupation of it would place Japan entirely at the former's mercy. In addition, Japan owned all of the railroads of Korea, and had tens of thousands of settlers there, as well as an enormous coast trade with this unprogressive, undeveloped country. Yet no one dreamed that this little Eastern Empire would dare risk annihilation at the hands of a great European country like Russia. For more than five months the Japanese government carried on negotiations with Russia in an attempt to make a peaceful settlement. The Japanese asked that the independence of Korea and Manchuria should be respected and that both countries should be open to foreign settlement and trade. When Japan realized the futility of these negotiations, war was declared on February 10, 1904.

Resources of Combatants. The opening of hostilities found Russia not wholly prepared. The guards and patrols of the Manchurian railways and the two garrisons of Vladivostok and Port Arthur numbered about 80,000 men in all. Japan had a trained army of 200,000 men. But behind Russia's army there were limitless men and limitless wealth; behind Japan's army there was a second army of 200,000 men of the older classes and nothing more. Russia's plan, therefore, was to avoid any active engagements until reënforcements had come from the West; Japan's was to attack immediately.

Japan Opens Fire. On February 8, two days before the formal declaration of war, the Japanese fleet under Vice-Admiral Togo swept down on the Russian Pacific squadron, drove it into the harbor at Port Arthur, laid mines in the entrance and succeeded in blowing up two of the largest of the Russian vessels which ventured forth. After this defeat the Russian fleet lay passive in the harbor for months. Japan, while maintaining the blockade of the port, was able to withdraw enough ships to land two

armies, one in Korea and one on the Liao-tung peninsula. While one force, under Kuroki, engaged Kuropatkin's troops in the north, the other army, with Oku in command, prepared to attack Port Arthur.

The first land battle was fought along the Yalu, the river which divides Korea and Manchuria. It lasted for five days and resulted in a decisive victory for the Japanese. During the four-months' campaign which followed, the Russians knew only one victory, the repulse of the Japanese at Tashichiao, in the west. Under its supreme commander, Marshal Oyama, the Japanese army moved north in a great semicircle, forcing the Russians back and hemming them in until at Liao-yang the campaign culminated in a furious battle in which the Russians were forced to retreat to Mukden.

The Siege of Port Arthur. The first move of the southern army was to occupy Nanshan Hill on the narrowest part of the Liao-tung peninsula, a position of enormous strength. This brilliant victory cut Port Arthur off from any chance of reënforcements from the north. The siege of Port Arthur, which followed the capture of Nanshan, is one of the remarkable military achievements of modern times. The Russians, by intrenching themselves among the rocks and on the steep hillsides, held out for two months before they were forced to withdraw inside the ring of forts surrounding the city. The Japanese, under Nogi, first attempted to take these fortifications by storm, but after seven days of fighting and bombarding, in which they lost 25,000 men, they realized the futility of this method of attack. In the five months following they literally tunneled their way into the very heart of the fortress, advancing by means of trenches, by undermining outposts, and by blowing up fortifications. These engineering operations served merely as a means of approach to the enemy and had to be followed up, in every case, by the fiercest kind of close fighting. On the second of January, 1905, Stoessel, the Russian commander, surrendered the city.

The Last Battles. In the meantime the second Japanese army, in the greatest land maneuver of modern times prior to the War of the Nations, forced the retreat of the Russian army under Kuropatkin towards the north. The Battle of Mukden in March, 1905, for which Japan had to put forth a supreme effort, resulted in the complete rout of the Russian army. The Japanese navy, under Admiral Togo, was also proving its supremacy. In the Battle of the Sea of Japan, the Russian Port Arthur squadron was destroyed and the Vladivostok squadron met with the same fate shortly afterwards. On the 27th of May the Baltic fleet was intercepted near Tsushima, on its way to Vladivostok, and practically every ship was captured and sunk.

The Treaty of Portsmouth. The war drifted on in a desultory fashion during the late spring and early summer, but both countries had had enough. Russia could import men at the rate of 30,000 a month over the Trans-Siberian Railway and reorganize its army, but its soldiers had no heart for further fighting. Japan was exhausted, having paid a terrific price both in men and money for its victory. So when Theodore Roosevelt, the President of the United States and an ardent advocate of international peace, proposed peace negotiations, both countries were ready to listen. By the terms of the treaty, which was signed at Portsmouth, N. H., on September 5, 1905, Russia ceded to Japan the southern half of Sakhalin, surrendered its lease of Port Arthur and adjacent territory, agreed to withdraw its troops from Manchuria, and to recognize Japan's sphere of influence in Korea.

B.M.W.

Consult Baring's *With the Russians in Manchuria;* Kuropatkin's *The Russian Army and the Japanese War.*

RUS'SO-TURK'ISH WARS. The many wars between Russia and Turkey cover a period of more than 200 years, from the beginning of the eighteenth century down to the War of the Nations, in which Turkey allied itself with Germany and Austria against Russia, England, France, Belgium and Italy (see WAR OF THE NATIONS). The main cause for this period of struggle has been Turkey's opposition to the eastward expansion of Russia into its territory. The antagonism inevitable between people of different religions—Christian Russians and Mohammedan Turks—has been a contributory cause, and the border uprisings of the half-civilized, warlike tribes on the boundaries of both countries have always furnished an excuse for invasion.

Wars of the Eighteenth Century. Peter the Great, inspired by the thought of waging war against the infidels for the cause of Christianity, and further actuated by his ambition to make Russia a great naval power, attacked and captured Azov, a Turkish port that had access to the Black Sea. The wars of his reign lasted from 1696 to 1711 and marked the beginning of the long enmity between the two countries. From that time on Russia and Turkey regarded each other as foes, for the interests of each were

a menace to the other. While Turkey grew weaker and weaker, Russia continued to develop, and the Moslem nation would probably have been absorbed if Russia had not been held in check by the other European nations, who were jealous of Russia's growing power.

Little is remembered to-day of the later wars of the eighteenth century except that they were the occasion of daring exploits on the part of Suvorov, a celebrated Russian field-marshal who won many spectacular victories over the Turks. In the war of 1736-1739 Austria was allied with Russia, and together they succeeded in freeing the Tartars in the south from allegiance to Turkey. By the war of 1787-1792 the boundaries of Russia were extended to the Dniester River.

Wars of the Nineteenth Century. There were four important wars during the nineteenth century. The first, lasting from 1806 to 1812, resulted in an extension of Russia's boundaries across the Dniester and on to the River Pruth, which gave it the province of Bessarabia. By the second, the war of 1827-1829, which ended with the Treaty of Adrianople, Russia forced Turkey to recognize the independence of Greece. The third was the Crimean War (1854-1856), in which Turkey fought with England, France and Sardinia against Russia, and got back a part of Bessarabia (see CRIMEA, subhead *Crimean War*).

The last war of the century is the one usually referred to as the Russo-Turkish War (1877-1878). Russia had never wavered in its determination to regain the territory and influence lost in the Crimean War, and in 1877 an excuse was found for attack in the massacres of the Christian peasants in Bulgaria. The most interesting feature of the war is that Russia fought and won by modern methods. The value of "spade work," improvised trenches and fortifications for securing invisibility, was clearly demonstrated by the Russian forces. These methods won the siege of Plevna, the turning point of the war, when the heroic army of Osman, the Turkish general, was captured. With the exception of this one siege and the rout of the Turkish army at Philippopolis, there were no decisive battles. It was an endurance test in which Russia succeeded in wearing out the Turks. The Treaty of San Stefano, which ended the war, was very favorable to Russia, but three months later England, backed by the other European powers, intervened and succeeded in modifying the terms of the treaty. For details, see BERLIN, CONGRESS OF. A.C.

RUST, in the arts, a brownish-red substance that forms on the surface of iron or steel when they are exposed to a damp atmosphere. The term without modification means *iron rust,* which is a compound of oxygen and iron, commonly known as the red oxide of iron. Rust is formed by the union of the oxygen of the air with the iron, and moisture is an important agent in producing the change. When rust is formed the surface of the metal is corroded, so that a polished surface is made rough. Rust not only corrodes the surface, but it weakens the metal. Long exposure to air and moisture, for instance, will cause nails to rust off, and rust frequently eats holes through sheet iron. Articles of iron and steel should be kept in dry places, or their surfaces should be coated with some substance that will resist the action of oxygen. Polished tools are easily protected by wiping them over with a cloth soaked in oil. See OXYGEN.

How to Remove Rust. Rust may be removed from iron and steel by scrubbing with water, or by the use of the flour of emery or any other polishing powder, provided the rust has not been forming for too long a time. A thick coat of rust requires the use of an emery wheel, a grindstone or a file for its removal. The brownish-yellow spots of iron rust formed on linen may be removed by soaking the fabric in a weak solution of oxalic acid for a short time and then thoroughly washing it. A strong solution of this acid will weaken and may destroy the fabric. Sometimes lemon juice is used with success.

RUSTS, in botany, various forms of fungus that grow upon other plants (see FUNGI). The name was applied because the growth bears a close resemblance to iron rust. There are numerous varieties of rust. Black rusts are dark, and sometimes almost black. Rusts grow upon both wild and cultivated plants; those that attack grains cause a great deal of damage. It is estimated that the red rust on wheat causes the farmers of the continent a loss of from $10,000,000 to $15,000,000 annually, and in addition to this it causes more or less damage to oats and barley. The damage from rust in the great grain-growing regions of Canada is relatively much less than in the United States.

Rust consists of a minute fungus that fastens itself on the stems and leaves of the plants, appearing at first as tiny black or brown dots. The fungi multiply rapidly, drawing their nourishment from the plant and sapping its vitality. Wheat affected by rust produces a small yield,

and the grain is of inferior quality. Rust is propagated by minute spores. These spores survive the winter and begin to grow in the spring, but unless they are carried to a barberry bush or some other plant from which they can derive nourishment they soon die. A field infested with rust one season seldom escapes the next, and the only successful method of preventing a second disaster consists in ridding the field of the spores.

After the harvest, burn the stubble and all infested straw. If this straw is used for litter, it will be carried in the manure to other fields and infest them with rust. If possible, plant the field with some other crop the following season. A tillage crop, such as corn or potatoes, is best. Hard, red wheat resists rust better than the soft, white varieties and a change from a soft to a hard variety will often prevent the spread of the disease. Never sow wheat on stubble land where rust has been abundant, for the ground is full of spores which will find lodgment in the new crop.

Consult Massee's *Mildews, Rusts and Smuts.*

RUTH, *rooth,* a book of the Old Testament, an exquisite narrative of Hebrew rural life "at the time when the judges judged." Ruth is also the name of the heroine of the story. She was a Moabitish damsel, the widow of an Israelite whose family had taken refuge from famine in Moab. Ruth's affection for Naomi, her husband's mother, and her loyalty to the family into which she had married, are revealed in her answer to Naomi's plea that she return to her own home:

> Intreat me not to leave thee,
> Or to return from following after thee:
> For whither thou goest, I will go;
> And where thou lodgest, I will lodge:
> Thy people shall be my people,
> And thy God my God:
> Where thou diest, will I die,
> And there will I be buried:
> The Lord do so to me, and more also,
> If aught but death part me and thee.

Then the two women journeyed to the land of Judah. Ruth's fine qualities came to the notice of Boaz, a wealthy landowner of Bethlehem, in whose fields she gleaned. As a kinsman of Naomi, he showed her many acts of courtesy and later made her his wife. Thus the alien maid became the grandmother of King David and direct ancestress in the Messianic line.

RUTHENIANS, *ru the' nĭ anz,* or **LITTLE RUSSIANS,** the name given the Slav inhabitants of Southern Russia and Austria on both sides of the Carpathian Mountains. There are in all about 20,000,000, and one-fourth of them reside in Galicia. The majority are characterized by short stature, chestnut hair and brown eyes. They speak the Russian language and most of them belong to the United Greek Church. Previous to the seventeenth century they were an independent people. They were then conquered by the Lithuanians and later by the Poles, and their territory was annexed to Poland. When Poland was divided they came under the control of Russia and Austria. Most of them are agriculturists, but they adhere to old methods and employ implements long since discarded by more progressive peoples. Lemberg is their chief city. See GALICIA.

RUTH'ERFORD, ALEXANDER CAMERON (1855-), a Canadian barrister and statesman, first premier of Alberta, from 1905 to 1911. He was born at Osgoode, Carleton County, Ontario, attended the Metcalfe High School and Woodstock College, and was graduated from McGill University. After he was called to the bar in 1885, he practiced law at Ottawa for ten years, removing to Alberta. There he became active in the Liberal party, and was for several years secretary-treasurer of the town of Strathcona and of the Strathcona school district. In 1902 he was elected to the Northwest assembly, and during its last sessions was deputy speaker. In 1905, on the organization of the province of Alberta, Rutherford formed the first cabinet, he himself assuming the portfolios of the treasury and education in addition to the premiership. During the Rutherford administration the entire governmental machinery was set in motion, the public school and judicial system were established, a government-owned telephone system was introduced, and liberal aid extended to railways and other industrial enterprises. The downfall of the Rutherford ministry was caused in 1911 by the proposal to build the Alberta and Great Waterways Railway under terms which were criticized as disadvantageous to the public interest. After his resignation from the premiership Rutherford continued to serve in the assembly. His successor as premier was Arthur L. Sifton (which see).

RUTILE, *roo' til,* a beautiful reddish or yellowish-red mineral that sometimes occurs in transparent quartz, in the form of hairlike crystals. It imparts to the quartz the appearance of having colored threads extended through it. Rutile also occurs in larger masses in some of the older rocks in Sweden, in the Ural Moun-

tains and in the United States. It is employed for imparting a yellow color to glass and porcelain, and some of the finest specimens are polished and set, forming beautiful gems.

RUT'LAND, VT., called *The Marble City,* is the center of the greatest marble industry in the United States. It is the county seat of Rutland County, and is situated in the central part of the state, on Otter Creek. Burlington is sixty-eight miles northwest, Bennington is fifty-seven miles southwest, Boston is 168 miles southeast and Montreal is 168 miles northwest. The Rutland, the Delaware & Hudson and the Clarendon & Pittsford railways enter the city, and electric lines connect with adjacent towns west. In population, Rutland ranks next to Burlington, the metropolis of the state. The population increased from 13,546 in 1910 to 14,831 in 1920, a 10 per cent gain. The area exceeds eight square miles.

Rutland lies near some of the loftiest peaks of the Green Mountains, famed for their forest-clad slopes, and in a fertile valley noted for its maple sugar, maple syrup, honey and dairy products. More important than these sources of prosperity are the great marble quarries of the vicinity. The weight of marble quarried annually in the county is estimated at 90,000 tons, exclusive of waste. Three-fourths of the marble-working machinery used in the United States is made at Rutland. Besides, the city has large plants for making scales, utensils used in the maple sugar industry, and stone-working machinery. In 1920 there were in all 64 factories, with capital of $7,066 000. Value of products in 1919, almost $6,669,000. The noteworthy architectural features of Rutland are Memorial Hall, built of marble, a Federal building which cost $107,000, the county courthouse, the city hall, the City Hospital and the House of Correction. In addition to the public and parochial schools there are Saint Joseph's Academy, the public library and the H. H. Baxter Memorial Library.

The first settlement was made in 1770, and for many years it was claimed by both New Hampshire and New York. In 1772 the village was chartered as Socialborough, but the name was not retained. In 1781 Rutland became the county seat, and from 1784 until 1804 it was one of the two capitals of Vermont. In 1892 it was chartered as a city. From it, in 1886, the towns of Proctor and West Rutland were set off under separate governments.

RUTLEDGE, *rut'lej,* JOHN (1739-1800), the first state governor of South Carolina and one of the great figures of Revolutionary days. He was born in Charleston, S. C. From the very beginning of the trouble with England he was an influential leader on the side of the colonies, and was one of the first to urge actual independence. He represented South Carolina in the Stamp Act Congress and again in the first Continental Congress, and when, in 1774, the colony declared itself an independent state, Rutledge served on the committee which drafted its constitution and became its first executive, with the title of president.

It was largely through his foresight and patriotic ardor that Charleston was so fortified as to be able to repel the first British attack in 1775. When the English captured the city in 1780, after a two months' siege, Governor Rutledge joined the army of Nathanael Greene in North Carolina. At the close of the war he again served in Congress, being a member of the convention which framed the Constitution of the United States. He was successively Associate Justice of the national Supreme Court, chief justice of the supreme court of South Carolina, and Chief Justice of the United States Supreme Court. In the latter capacity he had presided over only one term when his reason failed, and the Senate never confirmed his appointment.

RUYSDAEL, or **RUISDAEL,** *rois'dahl,* JACOB (about 1628-1682), Holland's foremost painter of landscape. Though his canvases often give a suggestion of melancholy, because of his fondness for painting clouded skies, dark masses of leaves and other somber aspects of nature, his pictures have a charm that comes from poetic and sympathetic treatment. In all of his work the technique is admirable, both in the rendering of detail and in the execution of broad effects, and he always painted truthfully what he saw. Ruysdael was born at Haarlem, where he had as a teacher his uncle, Salomon Ruysdael. His best work was accomplished in the period between 1660 and 1675, in the city of Amsterdam. The last years of his life were darkened by poverty and illness, and he died in an almshouse.

Ruysdael painted with equal facility quiet, flat landscapes, stormy seas and mountainous scenery, though his favorite subjects were the quiet scenes of his native Holland. Some of the best examples of his work are *View of Haarlem* and *Agitated Sea* (Berlin Museum); *Jewish Cemetery* (Dresden Gallery); *Landscape with Ruins* (National Gallery, London); *Storm at Sea* (Louvre). The Metropolitan Museum in

New York possesses *Cottage Under Trees, Forest Stream* and *Wheatfields,* and there are many other canvases in private collections in America.

RUYTER, *roi'ter,* or *ri'ter,* MICHAEL ADRIAANSZOON DE (1607-1676), a Dutch admiral who ranks with the greatest of Holland's fighting seamen. He was born at Flushing and was a sailor from his boyhood. In 1641, having risen to the rank of rear admiral, Ruyter took charge of a squadron sent to help the Portuguese against the Spanish; a few years later he was successfully fighting against the Barbary pirates in the Mediterranean. In 1652, when Tromp won his great victory over Blake in the English Channel, he had Ruyter as his assistant. The latter was given chief command of the Dutch fleet after the death of Tromp, and though he was not always successful, he was a hard foe to conquer. He died in 1676 from the effects of wounds received in a battle with the French.

RYAN, ABRAM JOSEPH (1839-1886), a Roman Catholic priest and American poet who served as chaplain in the Confederate army throughout the War of Secession. He was born in Norfolk, Va., August 15, 1839, and had been ordained only a short time when the war broke out. His first work, after peace was declared, was in New Orleans, editing *The Star,* a religious weekly paper, work which he combined with his duties as a priest. He left New Orleans to go to Atlanta, Ga., where he founded and conducted a political and religious weekly called *The Banner of the South.* He was later in charge of a parish in Mobile, Ala., and from there he went North to lecture and to supervise the publishing of a volume of his poems. *The Conquered Banner, The Lost Cause* and *The Flag of Erin* were three of his best poems.

RYAN, PATRICK JOHN (1831-1911), an American Roman Catholic prelate, archbishop of Philadelphia. He was born at Thurles, County Tipperary, Ireland, studied at Carlow College with the idea of working in the United States, and emigrated to Saint Louis at the age of twenty-two. In that city he was ordained priest and made professor of English literature at Carondelet Theological Seminary.

ARCHBISHOP RYAN

After serving for a time as rector of the Saint Louis Cathedral he was transferred to the Church of Saint John the Evangelist, and in 1872 was consecrated bishop of Triconia, and made coadjutor to the archbishop of Saint Louis. Eleven years later he was promoted to the archbishopric, and in the next year was transferred to the important archdiocese of Philadelphia, one of the most important in the United States, having at the time a population of nearly half a million of Roman Catholics. He was particularly distinguished as a preacher, and in 1868 was invited by Pope Pius IX to deliver the Lenten lectures in Rome. In 1902 President Roosevelt made him a member of the Indian Commission. Archbishop Ryan's published works are *What Catholics Do Not Believe* and *Causes of Modern Religious Skepticism.*

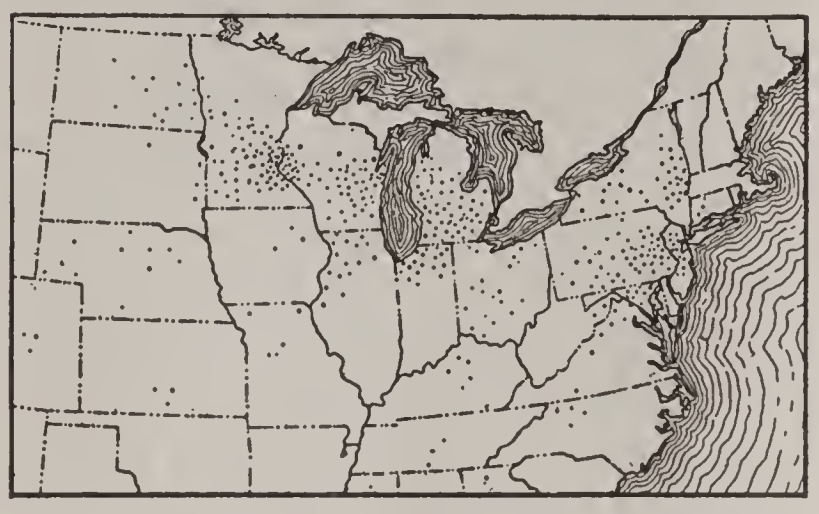
RYE, *ri,* a grain closely resembling wheat and barley, raised in the cool regions of Europe, Asia and America. Russia is the leading rye-producing country, its crop averaging about 880,000,000 bushels; Germany follows, with

THE CHIEF RYE COUNTRIES

about 456,000,000 bushels. In the United States the crop amounts to about 44,000,000 bushels, and in Canada it is a little less than 2,500,000 bushels. Rye is the hardiest cereal known, and will succeed where other grains cannot be raised. Two varieties, the spring and the winter, are grown. The winter variety is sown in the fall and harvested in June or early in July. The spring variety is raised chiefly for forage. Winter rye is successfully grown in Alaska, where it is a valuable crop.

Rye is adapted to light, sandy soils and does not thrive well on heavy damp soils. While it is not so valuable as wheat for food, its adaptability to a cool climate and a light soil makes it one of the most important food plants

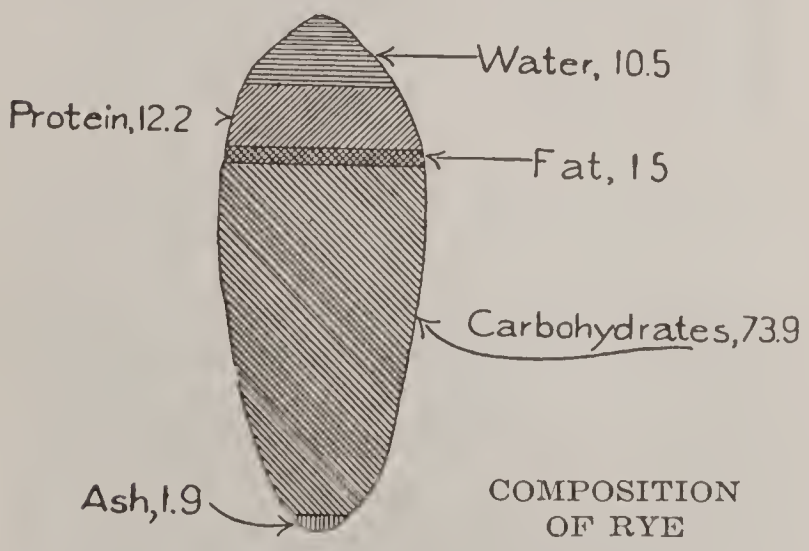
of Northern Europe. The grain is sown broadcast or in drills, like wheat, and from one and one-half to two bushels of seed per acre are required. Under favorable conditions the yield is from twenty to thirty bushels per acre. The price varies from fifty cents to eighty cents per



PRODUCTION IN THE UNITED STATES
Where the dots are most numerous on the map the yield is greatest.

bushel, according to supply and demand. In the United States fifty-six pounds of rye make a bushel.

Rye flour is obtained by a milling process similar to that used in the manufacture of wheat flour (see FLOUR). Three products—bran, shorts and flour—are obtained. The flour is made into the black bread so generally eaten by the people of Northern Europe. It is more compact and a little less nutritious than wheat bread. In the United States wheat and corn flour are mixed with rye flour in making rye bread, which is used to a limited extent. The



COMPOSITION OF RYE

chief use of rye in the United States is in the manufacture of malt and spirituous liquors, of which rye whisky is a good example. In Holland it is employed in the manufacture of Holland gin, and in Russia large quantities were formerly consumed in the production of kvass, a national beverage.

Rye is a good fodder for stock, and when used for this purpose the whole kernel is ground. It makes a good forage crop if fed before the heads form. It is sometimes used as a cover crop and for green manuring (see FERTILIZER). The straw is long, smooth and flexible. It is made into hats and mats, and is employed for packing crockery and glassware, in the manufacture of some grades of paper and for stuffing mattresses and horse collars. In European countries where thatched roofs are still common it is extensively employed as a thatch, since it resists decay better than most other straws.

Rye is subject to a fungous disease called ergot (which see).

RYE HOUSE PLOT, a scheme devised by a few of the most radical members of the English Whig party in 1683, the purpose of which was to waylay and assassinate Charles II on his return from the Newmarket races. The deed was to be perpetrated at Rye House Farm, the country place of one of the conspirators; from this circumstance the plot obtained its name. The house which the king occupied at Newmarket burned, and Charles was thus forced to leave eight days sooner than was expected, which frustrated the plans of the would-be assassins. For supposed complicity in this plot Lord William Russell and Algernon Sidney were beheaded, though the evidence against them was not sufficient to prove their guilt. Another alleged conspirator, the Earl of Essex, committed suicide in the Tower.

RYERSON, *ri' er son*, EGERTON (1803-1882), a Canadian educator and clergyman, founder of Ontario's public school system and the foremost Methodist of his time. Dr. Ryerson was born at Charlotteville, Ont. He studied for the Methodist Episcopal ministry, and at the age of twenty-two began his career as a minister. After filling several pastorates, he helped to found in 1829, and became the first editor of, the *Christian Guardian,* the official organ of the Canadian Methodist Church. He then began to take an active part in educational affairs, obtained a charter in 1836 for Upper Canada Academy (later Victoria University) at Cobourg, and in 1841 was appointed its first principal.

EGERTON RYERSON

Dr. Ryerson favored the establishment of denominational colleges, but he urged that they should be affiliated with a central provincial institution. This plan has been worked out in the University of Toronto. In 1848 he was chosen superintendent of education for Upper Canada. This office he held until Confederation, when he assumed the same position for the province of Ontario, the combined service covering thirty-two years. He drafted and procured the passage of laws which established the principles of Ontario's school system, which has been copied, to a greater or less degree, by the other provinces.

In religious affairs Dr. Ryerson was equally active. In 1874 he was elected president of the first General Conference of the Methodist Church in Canada; this office he held four years. On several occasions he was delegate of the Canadian conference to conferences in England. Neither religion nor education, however, stifled his interest in political affairs. He was a United Empire Loyalist by descent and a Tory by sympathy, but he would not apply narrow Tory principles in education or religion. He favored the secularization of the clergy reserves and opposed further efforts to confine government endowments of any kind to a particular denomination. Responsible government he opposed, because he feared that Canada might suffer from it in an extreme form.

Dr. Ryerson was an orator of distinction, and frequently spoke on the platform as well as in the pulpit. He was also a contributor to journals and wrote a number of books which are valuable sources in Canadian history. These are *Affairs of the Canadas; Report on Popular Education; Letters in Defense of Our School System; The Loyalists of America and Their Times;* and *The Story of My Life,* an autobiography.

RYSWICK, *ris'wik,* TREATY OF, a peace agreement made in 1697 at Ryswick, near The Hague, between Louis XIV of France and the coalition of European powers known as the Grand Alliance. It brought to a close a nine-years' war waged against Louis, whose ambitious designs menaced the independence of the nations of Europe. The various conquests made by both sides during the struggle were given up, and the power of Louis from that time began to wane. See FRANCE, subtitle *History of France;* LOUIS, subhead *Louis XIV;* WILLIAM III (England).

THE WORLD BOOK
ORGANIZED KNOWLEDGE IN STORY AND PICTURE
TRADE MARK REGISTERED

Ss

S is the nineteenth letter in the English alphabet. The Phoenician letter from which it was derived was shaped much like a capital *W,* and was called *shin,* which meant *tooth.* Doubtless it was intended to represent two teeth, though it looks like those of a saw rather than those of a human being. The Greeks turned the letter on its side, and called it *sigma,* and the Romans, when they adopted it, gradually dropped the lowest line and rounded it into the form of modern capital *S.*

The letter has had in all these languages about the same sound, though it is probable that in the Phoenician it had rather more of the *sh* value than is common to-day. In English, *s* has four sounds: the proper *s,* or "hissing" sound, as in *sit;* the *z,* or "buzzing" sound, as in *music;* the *sh* sound, as in *sure,* which is uncommon except before *i* in such words as *mansion;* and the *zh* sound, as in *decision. S* is also used with *h* in a very common digraph, or letter combination.

SABBATH, *sab'ath,* the rest day of the Jews, observed on the seventh day of the week. In ancient times it was a joyous, holy day on which the people ceased from toil, visited the sanctuary and offered a double number of sacrifices. The Sabbath was in existence from the earliest times, but was first ritualized by Moses, and the duty of its observance was made the subject of one of the Ten Commandments.

After the Babylonian exile, Sabbath observance became very rigid, and the Jews suffered many losses and indignities at the hands of their enemies rather than break the Sabbath laws. In the oral law, twenty-nine major and minor kinds of labors were forbidden. Bearing burdens, lighting fires and traveling more than a Sabbath day's journey (less than a mile) were not allowed. The attitude of Jesus in regard to these regulations is summarized in the statements—"It is lawful to do well on the Sabbath day," and "The Sabbath was made for man and not man for the Sabbath." Except in the Gospels, the Sabbath is not mentioned in the New Testament writings. There is reference, however, to the first day of the week (Sunday), observed in commemoration of the resurrection of Jesus. Observance of Sunday as a holy day has become practically universal in the Christian Church, though the Seventh-Day Adventists (which see) recognize Saturday as the Sabbath. See SUNDAY.

Consult Jastrow's *Hebrew and Babylonian Traditions.*

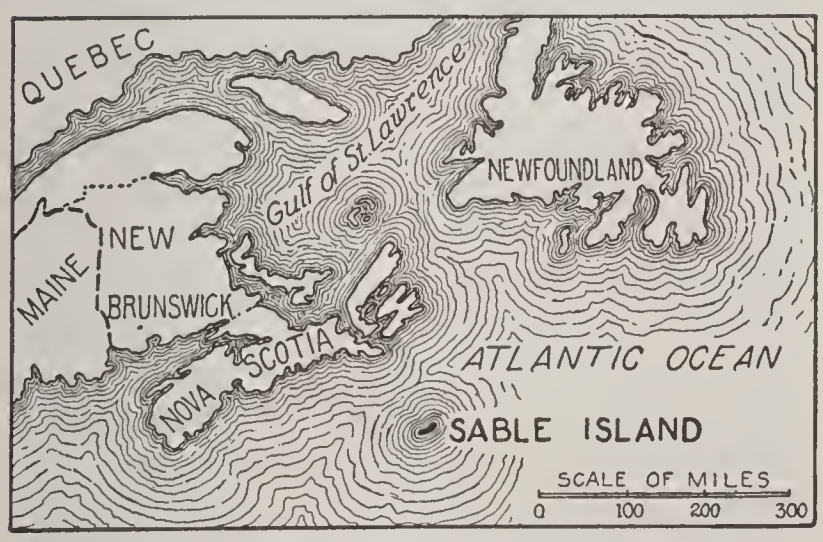
SABINE, *sa been',* **RIVER,** a stream which rises in Northeastern Texas, flows southeast for 250 miles, and then south on the lower half of the boundary between Texas and Louisiana through Sabine Lake and Sabine Pass into the Gulf of Mexico. Its entire length is 500 miles. The Sabine Pass is a narrow channel with a muddy bar at its mouth, and though often dredged, it cannot be used by large steamers. Even small boats can ascend for only a short distance. Orange, Tex., a lumbering center, is the principal town on its banks, and Port Arthur is on the Texas shore of Sabine Lake.

SABINES, *sa'bines,* an ancient Italian people whose daughters were seized and carried off by the early Roman youths, while they were all being entertained at a great festival. According to the legend, after Romulus had built Rome he found that there were few women among the inhabitants, so he sent embassies to the neighboring cities to ask that his people

might take wives from among them. When his request was refused, he planned to invite all the surrounding people to an elaborate entertainment. In the midst of the games, the Romans violated the laws of hospitality by seizing the young women, but after the Sabines had been dissuaded from making war, the two nations were combined as one, the Sabines settling on Quirinal Hill.

SABLE, *sa' b'l,* a small mammal belonging to the fur-bearing group of animals, and having the most valuable pelt of them all. It is native to Siberia and is closely related to the North American *pine marten,* or *American sable,* as the latter is sometimes called (see illustration, page 3666). The sable is usually not over a foot and a half in length. Its fur is a lustrous dark brown, with grayish-yellow spots on the sides of the neck, and a single pelt of highest quality is worth about $200. Less expensive grades run to about $50. In European countries sable is used in the robes of sovereigns and state dignitaries; a coat of this fur owned by Nicholas II, former czar of Russia, is said to be worth $22,000. The animal is somewhat difficult to capture, and is caught in traps especially designed to prevent injury to the fur. The fur of the muskrat and that of the hare are dyed and sold as imitation sable. For habits of the animal see the article MARTEN. See, also, FUR AND FUR TRADE.

SABLE ISLAND, sometimes called the "Graveyard of the Atlantic," and known to early navigators as Santa Cruz, or "Holy Cross," is a low, sandy island about one hundred miles off the southern coast of Nova



LOCATION OF SABLE ISLAND

Scotia. It is on the northern lane of travel between Europe and America, and over 200 wrecks have occurred near the treacherous Cape Sable, which juts out into the Atlantic at the southern extremity of the island. Sable Island is crescent-shaped, about twenty miles long and one mile broad. The Canadian government has caused thousands of trees to be planted on the island to bind more solidly the shifting sandy soil. Before the trees were planted the shape of the island was continually being changed by the pounding of the Atlantic waves. The government also maintains there a life-saving station, wireless telegraph station and a lighthouse. Cranberries grow in large quantities, and the island supports a hardy breed of ponies.

SABOTAGE, *sab o tazh',* a comparatively new means adopted by certain classes of workmen in their labor struggles with employers. The word is of French derivation, and means *scamped work.* The practice of sabotage first meant rendering too little service for wages paid, doing poorly the work assigned, or using poor material where better quality was ordered, thus injuring the value and reputation of manufactured goods. Radicals and irresponsible men found such means were too slow in their effects, so to-day sabotage has reached the point in practice where it may be defined as malicious waste or destruction of property of an employer.

In the lumber industry, for instance, it may mean cutting logs shorter than the required length or sawing boards thinner than ordered; it may mean driving spikes into logs so saws will be ruined. In a machine shop it may mean putting sand or iron filings into oil cups or gearings, loosening bolts or purposely mislaying tools to cause delays. In building construction it may mean weak mixture of mortar or waste of material; in street paving, instability of foundation or poorly-prepared material. In any trade or occupation it may mean "laying down on the job"—working so slowly and accomplishing so little that the employer suffers loss.

It is not to the advantage of those who practice sabotage to destroy machinery or even to damage it very seriously, for such maliciousness may involve loss of wages after labor trouble is adjusted until repairs can be made. Everything which can irritate and embarrass the employer and diminish production is employed in secret; that some of the acts resorted to are criminal does not deter the guilty persons, for detection is difficult, and it is almost impossible to place responsibility.

Sabotage is severely condemned by all reputable labor unions; it is the weapon of the man without conscience; it lacks the element of fair play, and wherever employed it widens the breach between labor and capital.

One organization, known as the Industrial Workers of the World (the "I. W. W."), does not deny that on occasion it has advised sabotage. E.D.F.

SAC, *sak,* or **SAUK,** *sawk,* a warlike tribe of the Algonquian family, who were persistently hostile to early white settlers. Black Hawk (which see), their greatest chief, was one of the most famous Indians of American history. French explorers found the tribe in Northern Wisconsin, in the latter part of the seventeenth century. The Sacs and their kinsmen, the Foxes, who also lived in that region, were driven southward by the Ojibwa, and ultimately the two kindred tribes formed a confederacy. These Indians were gradually forced west of the Mississippi River, and the few remaining live in Kansas and Oklahoma. See Fox.

SACCHARIN, *sak'a rin,* a white, odorless powder, a compound of coal tar, which when pure is five hundred times sweeter than cane sugar. It was discovered in 1879 by Dr. Constantin Fahlberg, of Germany, and Ira Remsen, a noted American chemist, and was later patented in Europe and in the United States. The manufactured product often contains a large percentage of impurities which considerably lessen its sweetening power. It is sold usually in tablet form. Saccharin dissolves very little in cold water, somewhat more in hot, and is thoroughly soluble in alcohol. Although it is so much sweeter than sugar, it is not nearly equal to the latter in food value. However, because it does not ferment in the stomach it is often given to persons having diabetes, where sugar would be harmful. It is used chiefly in candy making, baking and preserving, and in the making of cordials and mineral waters.

SACHS, *zahks,* Hans (1494-1576), a German poet, the most famous of the mastersingers. He was born in Nuremberg, learned the trade of shoemaking, and spent several years traveling about the country as a journeyman shoemaker. He had received a good education and followed this with instruction in the art of the mastersingers, so that his songs, fables and dramas soon became famous. In 1516 he settled in Nuremberg, where he remained for the rest of his life. The doctrines of Luther interested him greatly, and he wrote in support of the Reformation, always contending for peace and moderation. The works of Sachs are not only better, but more numerous, than those of any other mastersinger. Altogether, including tales and fables in verse, dramas, hymns and songs, he left not fewer than 6,300 pieces. These show humor as well as sentiment, and though he had always some didactic purpose in mind, it is not unpleasantly apparent. See Mastersingers.

SACKVILLE, a town in Westmoreland County, New Brunswick, in the southeastern part of the province. It is on the Tantramar River, about five miles from its mouth in Chignecto Bay, and on the main line of the Intercolonial Railway. It is also the terminus of the Intercolonial's Shediac branch, which connects with the Prince Edward Island ferry at Cape Tormentine. Moncton is thirty-eight miles northwest of Sackville by rail, Cape Tormentine is thirty-six miles northeast, and Truro is eighty-six miles southeast. Population in 1911, 2,039; in 1921, 3,265.

Sackville is well known as the seat of Mount Allison University and Ladies' College. It is also a manufacturing center, having several large stove, harness and shoe factories. Less important are the carriage works, paper-box factory and woodworking plant. The town has a considerable trade in coal, lumber, molasses and sugar. The neighborhood supplies stone and lumber, especially spruce and some hard woods, and is also a fertile farming district. Sackville was incorporated as a town in 1903.

SACO RIVER, *saw' ko,* a river which rises in the White Mountains of New Hampshire, flows through Crawford Notch and southeast through Maine, emptying into the Atlantic by way of Saco Bay. It is a swift-flowing stream, about 105 miles in length, and has many beautiful rapids and falls. These render it useless for navigation, but furnish excellent water power. At the town of Saco, Me., there is a waterfall forty-two feet high, which provides power for several cotton and woolen mills and brick factories.

SACRAMENT, *sak' ra ment,* in the Christian Church, a solemn observance instituted for the spiritual benefit of the participants. In the Eastern and Roman Catholic Churches there are seven sacraments—Baptism, Confirmation, Holy Eucharist, Penance, Extreme Unction, Holy Orders and Matrimony. Most Protestant Churches recognize only two—Baptism and the Eucharist, or the Lord's Supper. Quakers reject all sacraments as unnecessary formalities. As to the meaning of the sacraments, Roman Catholics consider them effective, in themselves, for salvation. Most Protestant Churches regard them as visible signs of a covenant between God and the individual.

SACRAMENTO, *sak ra men' toh,* Cal., the state capital and the county seat of Sacramento

County, beautifully situated along the Sacramento River in the north-central part of the state, ninety miles northeast of San Francisco. It is served by the Southern Pacific and Western Pacific railroads and by an extensive system of electric interurban lines. Its population increased from 44,696 in 1910 to 65,857 (Federal census) in 1920. Among this number are Japanese, Chinese and Hindus. The area of the city is about fourteen square miles.

The fine state capitol, completed in 1869 at a cost of $2,500,000, stands in a park of thirty-four acres in the center of the city. Plans were being perfected in 1917 to enlarge the capitol grounds and erect other buildings to cost $3,000,000. The city has a Federal building, erected in 1894 at a cost of $500,000 and enlarged in 1912 at a cost of $150,000; a city hall, courthouse, Crocker Art Gallery, Y. M. C. A. building, the Foresters, Fruit Exchange and Forum buildings, Masonic, Elks' and Odd Fellows' buildings, the Women's and Sutter clubs, and Travelers' and Sacramento hotels. The parked area exceeds 1,000 acres, and includes Capitol Park, McKinley, South Side, Del Paso and many smaller parks. The State Agricultural Society conducts the annual state fair at Sacramento. Educational and benevolent institutions include the state library, one of the largest on the coast, the public and the Odd Fellows' libraries, Christian Brothers' College, Howe's Academy, Saint Joseph's Academy, the Marguerite Home and the Protestant Orphan Asylum, and the Southern Pacific Railroad and county hospitals.

The city is in one of the most productive agricultural regions of the state, the Sacramento River Valley. The annual harvest of fruit (citrus and deciduous) and nuts in Sacramento County is worth approximately $2,500,000. Establishments connected with the fruit business are among the city's most important industrial plants. The value of manufactured products is about $14,000,000 a year, representing the output of canneries, flour mills, gristmills, foundries and machine shops, slaughtering and meat-packing establishments, and manufactories of harness and saddles, carriages, furniture, soap and other commodities. Both railroads have shops here; the Southern Pacific shops employ 3,500 men.

After obtaining a grant of land from the Mexican government, Captain John A. Sutter, with a few trappers and Indians, made a settlement on the site of Sacramento in 1839. The founder called it *New Helvetia*, but it was popularly known as *Sutter's Fort;* it was the first settlement in California reached by the overland immigrants. The fort itself has been restored. In 1848 the town was planned; it was incorporated the following year, was chosen as the state capital in 1854 and became a city in 1863. The commission form of government was adopted in 1912. During its early years the city suffered from floods, but a levee along the river has removed this danger. The stream is now crossed by several fine bridges within the city limits. S.G.A.

SACRAMENTO RIVER, the largest river in California, which drains a fertile valley in the northern half of the state, where the oldest settlements are located. It rises on the western slope of beautiful Mount Shasta and flows south into Suisun Bay, on the boundary between Contra Costa and Solano counties. The San Joaquin and Pitt rivers, the latter sometimes called the Upper Sacramento, are its principal tributaries, but it receives numerous other smaller ones from the gold-mining districts. The Sacramento is about 600 miles long, and its drainage basin has an area of 27,100 square miles. It is navigable for small boats to Red Bluff, about 300 miles above its mouth, and for large vessels to the city of Sacramento (see above).

SACRED COLLEGE, *sa'kred kol'ej,* the entire body of cardinals, who are appointed by the Pope and share with him in the government of the Roman Catholic Church. In dignity and influence they are second only to the Pontiff himself. Their number has varied from time to time, present usage fixing it at seventy, of whom six are bishops, fifty are priests, and fourteen, deacons. Generally speaking, their duties consist in administering the affairs of the Church, under the direction of the Pope. The greatest responsibility of the Sacred College, however, falls upon its members on the death of a Pontiff, when they assemble to elect his successor. In order to hasten their agreement, as well as to protect them from outside influences, they are subjected to strict discipline during this period; the ceremony befitting their rank is foregone, and they are debarred from intercourse with the public. For a discussion of the office of cardinal, and a list of American members of the Sacred College, see the article Cardinal. G.W.M.

SACRIFICE, *sak'ri fise,* an offering to God for the purpose of communion, thanksgiving or means of atonement for sin, based on the idea that worship should consist not merely in words

but also in the giving of something dear to the worshiper. Two types of sacrifices were offered by the Jews, bloody and unbloody; that is, animals and fruits of the land. The bloody offerings were the *burnt offering,* a lamb, male and without blemish, offered twice daily by the priests in the name of the nation; the *peace offering,* a lamb or goat, male or female, without blemish, offered by families at new moons or on special occasions of thanksgiving, a part of which they ate according to prescribed rites; and the *guilt offering,* made by individuals for cleansing from sin and, once a year, on the Day of Atonement, by the priest for the sins of the nation. Unbloody, or *fruit offerings,* were offerings made on various occasions, of ears of corn, oil, incense, fine flour or unleavened cakes.

In the New Testament, the sacrifice of Christ on the cross, the innocent for the guilty, becomes the fulfilment of all former sacrifices: "For this He did, once, when He offered up Himself" (see *Hebrews* VII, 27).

SADDUCEES, *sad'u seez,* a religious sect active in Judea at the time of Christ, which had its origin among the aristocracy. Its members held many of the highest offices, and in contrast to the Pharisees, who kept themselves strictly from the world, they showed a strong inclination toward other than Jewish customs, valuing social standing, culture and wealth. Josephus, the Jewish historian, states that the Sadducees "had only the rich on their side, but not the common people." In belief, the Sadducees held to the written law of Moses, but denied the teaching of the Pharisees regarding the binding power of the oral law, the resurrection of the dead and the current doctrine of angels. They also affirmed the freedom of the will. After the fall of Jerusalem, in A. D. 70, the sect of the Sadducees disappeared. See PHARISEES.

SADI, *sah'de,* or *saw'de* (about 1184-1292), a great Persian poet, born at Shiraz. Under the protection of his patron, the Prince of Fars, he studied philosophy in Bagdad, and while there won fame by his writings. His patron was deposed by the Mongols in 1226, and Sadi in discouragement entered upon a period of wandering which continued for thirty years. After living for a considerable time in Damascus, he went to Jerusalem, where he dwelt as a hermit until he was captured by some Frankish crusaders and taken as a slave to Tripoli. Rescued by a wealthy friend, he returned at length to his home, where he spent his remaining years quietly.

His most important works, both of which were written near the end of his life, are the *Bustan,* or Fruit-Garden, and the *Gulistan,* or Rose-Garden, the former in verse, the latter in prose. Both are made up of discussions of philosophic and religious questions, interspersed with interesting tales and clever sayings.

SADOWA, *sah'doh vah,* BATTLE OF, was fought July 3, 1866, between the Prussians and Austrians, near the little village of Sadowa in Bohemia. The Austrian army of about 200,000 was commanded by General Benedek. King William I of Prussia directed the Prussians, who numbered 221,000. This battle was the decisive engagement of the Seven Weeks' War, as a result of which Prussia became the leading state of the North German Confederation and ultimately of the German Empire. See SEVEN WEEKS' WAR.

SAFE, a strong box of iron or steel, designed to protect money, jewels and valuable papers from loss by fire or theft. The simplest form is the fireproof safe, which is not intended to resist the assaults of burglars. It is a box having double walls of steel, between which a substance like concrete or clay is placed, to resist the action of heat. Such a safe is often imbedded in masonwork as a further safeguard.

The modern burglar-proof safe is a much more complicated structure. Expert cracksmen have called science to their aid, and make use of nitroglycerine and the oxyhydrogen blowpipe in reaching the interior of safes. To resist these attacks, safes are now made of great thickness, and weigh many tons. The walls are cast in a solid mass of iron or steel or built up of bars or plates of steel held in place by rivets. The cast-metal safes often have their strength reënforced by a network of wrought-steel rods, about which the metal is poured in a liquid state and allowed to harden. The vaults surrounding the safe of the Bank of France can be flooded from the Seine in case of danger, and in some banks steam can be released in similar circumstances.

Large safes of American manufacture are protected by several doors, one inside another. The bolts are controlled by time locks. These are clockwork devices which can be so adjusted that the bolts are drawn back automatically by a spring at the desired time. See LOCK.

SAFE'TY LAMP, a lamp designed to protect miners from explosions of fire damp. There are now many varieties of safety lamps on the market, but they are all based on the principle used by the English chemist, Sir Humphry

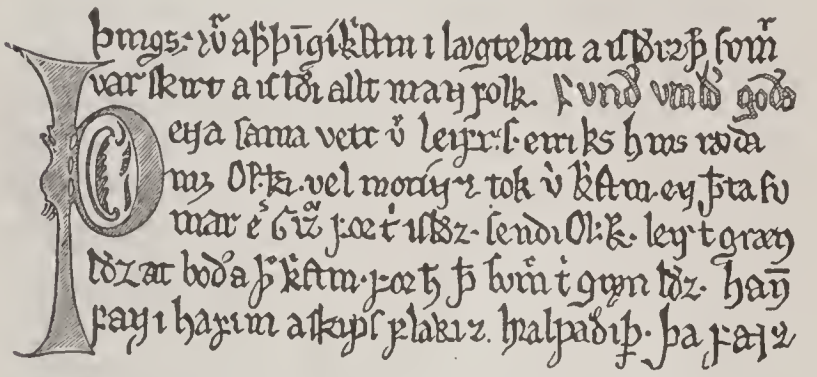
Davy, who invented the first lamp in 1816. It consists of an oil lamp surrounded by a cylinder of wire gauze of fine mesh, which forms a sort of cage. The heat of the flame will not pass beyond this gauze covering and ignite the gas on the outside until the wire becomes as hot as the flame, and owing to its good conducting power, it will not become so heated before the miner has time to withdraw from the chamber. One of the chief uses of the lamp is to warn the miner of the presence of the deadly fire damp; the other is to protect him from the danger arising from the presence of this gas. If fire damp invades the workings, it can be detected by lowering the wick, when a pale blue flame will be noticed about the central flame of the lamp. A reasonably prudent miner, observing this peculiarity, will at once leave the menaced workings, for explosions of fire damp are exceedingly destructive. See FIRE DAMP.

SAFETY VALVE, an appliance attached to steam boilers to allow steam to escape when the pressure becomes too great for safety. On stationary boilers the contrivance is quite simple; it is a kind of stopper, loaded with weights, closing a circular orifice. The weights are often hung at the outer end of a lever, and they hold the valve in place with a pressure which is carefully gauged so as to be several pounds below the pressure which it is thought the boiler may safely sustain. When the limit of safety is approached, the pressure of the steam raises the stopper and some of the steam escapes. The valve used on locomotive and marine boilers is held in place by a spring instead of a weight, but engineers prefer weights to springs wherever they can be employed advantageously, because the tension of the spring may vary, while the pressure of the weight is constant.

SAFFLOWER, *saf'lou er,* a thistlelike plant belonging to the Composite family (which see). It is cultivated in India, China, Egypt and Southern Europe for its orange-colored flowers. From these flowers, after they have been dried, yellow and red dyes are made. The red dye, which is the more valuable, is used to a limited extent in coloring silks in various shades of pink, rose, scarlet and crimson, but better substitutes have largely taken its place. It is also employed in the manufacture of rouge. The yellow dye is sometimes used to adulterate saffron (which see), but has little value as a coloring matter. Oil yielded by the seeds is used as fuel in lamps and for cooking purposes in the East.

SAFFRON, *saf'run,* a yellow coloring matter and flavoring material obtained by drying the stigmas of the yellow autumn crocus (see CROCUS). Four thousand flowers yield one ounce of commercial saffron. The product has a sweetish aromatic odor and a bitter taste. It is employed in cookery and to flavor and color candy, and, in Europe and India, as a condiment. Its use in painting and dyeing has declined with the discovery of cheaper coloring matters, and it is now considered of little value as a medicine, though once widely employed as a stimulant and preventive of spasms.

SAGAS, *sah'gaz,* or *sa'gaz,* the name given in Iceland to a form of literature which may best be described as the prose epic. The sagas are narratives, either historical, mythical or romantic, of the great heroes and rulers of



SPECIMEN OF SAGA MANUSCRIPT

Iceland, and they are composed according to rules as strict as those which govern verse. A typical saga traces the life of its hero from his birth to his death, including often, if his death was by violence, an account of the vengeance which his family took. Alliteration is common, and verse is often introduced as an ornament, though forming no part of the stories.

These sagas were originally preserved orally, and were composed to be recited at banquets or other festive gatherings, or in the long nights of that northern country where other diversions were few. By the twelfth century literary men had recognized the value of these tales and began to write them down, but by far the greater number were written in the thirteenth century. Naturally the aristocratic families were much interested in having the lives of their ancestors recorded in this form. Greatest of these compositions is the *Njalssaga,* the saga of law, but the *Eyrbyggiasaga,* with its store of history and traditions, is also a most valuable work. The romantic *Laxdaelasaga,* the *Gislasaga,* and the *Volsungasaga,* which contains the Nibelungen story in prose form, are also notable. The authors of some of these works are known, but there is no clue as to the identity of many of them.

SAGASTA, *sah gahs' tah,* PRAXEDES MATEO (1827-1903), a Spanish statesman and political leader who served his country during a critical period of its history. He began his career as a civil engineer. From the time he was elected to the Cortes of 1854 he held at various times the offices of Minister of the Interior, President of the Cortes, Minister of Foreign Affairs and Premier. Twice he was forced to flee to France, because of his prominence in the insurrections of 1856 and 1866. When events in Cuba were rapidly approaching a crisis, he was called to the head of affairs, and the unfavorable result of his earnest efforts to prevent war with the United States led to his resignation in 1899. He again assumed office in 1901 and resigned a year later when Alfonso XIII attained his majority.

SAGE, *sayj,* an herb of the mint family, cultivated for its aromatic stems and leaves, the flavor of which is due to an essential oil. Sage leaves are brewed to make a tea which has long been regarded as a standard household tonic and as an aid to digestion, and the plant is widely used to flavor sauces, dressings and cheese. There are numerous species of sage, both wild and cultivated. The common garden sage is a shrubby plant with rough, gray-green leaves and square stems. The flowers, which are blue with white and purple variations, grow in clusters. This plant can be propagated easily by slips or cuttings if grown in dry soil. Meadow sage, a blue-flowered species native to most parts of Europe, is cultivated as an ornamental plant in various parts of the United States. See MINT.

SAGE, RUSSELL (1816-1906), an American financier who acquired a fortune of $50,000,000 in railroad operations and stock speculation. He was born in Shenandoah, N. Y. His first great success was in company with Jay Gould, the greatest railroad manipulator of his time. Sage served his community in minor political offices and in 1853 was elected as a Whig to Congress, where he served two terms. The remainder of his long life was spent as a financier. He was a self-centered, austere man who made few friends and cared nothing for the criticism of his enemies. At his death his entire fortune was left to his wife, to dispose of as she pleased. See RUSSELL SAGE FOUNDATION.

Margaret Olivia Slocum Sage (1828-1918), wife of Russell Sage, was born at Syracuse, N. Y., and educated at the Troy Female Seminary. After the death of her husband she became known as one of America's greatest philanthropists. The Russell Sage Foundation, established by her in 1907, "for the improvement of social and living conditions in the United States," has an endowment fund of $10,000,000. Out of this fund model apartments have been built in New York City and its suburbs, and other work has been done along charitable, social and educational lines. Forest Hill Gardens, on Long Island, has been established as a model suburban community, and Marsh Island, in the Gulf of Mexico, has been purchased as a home for birds.

SAGEBRUSH, *sayj' brush,* a group of dry, shrubby plants belonging to the Composite family, several species of which are found on the alkaline plains of Western United States. The profuse growth of sagebrush in Nevada has given rise to the popular name *Sagebrush State* for that commonwealth, and Nevada's flower emblem is the sagebrush. The typical species grows from six to twelve feet in height and has a straight, stiff stem, on which grow in close profusion small, wedge-shaped leaves with from three to seven notches. The flowers, which consist of many tiny florets, grow at the top of the branches. Though the two plants are not related, some species of sagebrush look like sage, and are known by such names as *silvery sage, black sage* and *white sage.* Some varieties of sagebrush form the winter forage of sheep on the Western ranges, and in some sections the settlers use the plants for fuel.

SAGEBRUSH STALK

In the arid summer season on the plains the sagebrush dries until it shows no sign of green; when the high winds blow it frequently pulls loose and drifts over the plains in masses not unlike tumbleweed. Over thousands and thousands of square miles it is the characteristic, almost the only, form of vegetation.

SAGE GROUSE, *grous.* See GROUSE.

SAGHALIEN, ISLAND, *sah gah lyen',* the Japanese possession now known as Sakhalin (which see).

SAG'INAW, MICH., the third largest city in the state, next in size to Detroit and Grand Rapids, and the county seat of Saginaw

County, is a manufacturing city, about eighteen miles south of Saginaw Bay, sixteen miles southwest of Bay City and 105 miles northeast of Detroit. It extends along both banks of the Saginaw River, which is navigable from this point to its mouth, and is here crossed by a number of bridges. Saginaw is served by the Grand Trunk, Michigan Central and Pere Marquette railroads and by electric interurban lines. In 1910 the population was 50,510; it was 61,903 (Federal census) in 1920. About fifty per cent of the inhabitants are Germans, and there are a number of Italians, Bohemians and Poles. The area of the city is about fourteen square miles.

Saginaw has beautiful parks, of which the largest are Rust (136 acres), Hoyt (twenty-seven acres), Linton and Bliss. Prominent structures are a Federal building, courthouse, city hall, city auditorium, the Mershon-Whittier public natatorium, Masonic temples, an armory, Elks' Temple, Y. M. C. A. and Y. W. C. A. buildings and the public library. The principal institutions are the Burt Manual Training School, the Arthur Hill Trade School, which has a United States Weather Bureau Station, the Michigan Institute for the Blind, the Old Folks' Home, the Germania Institute, Saint Mary's, Woman's, Saginaw General and Detention hospitals, the Home for the Friendless and Saint Vincent's Orphan Home.

Saginaw has extensive sugar-beet factories which handle the large crops of the surrounding agricultural country. Another important industry is the mining of bituminous coal, the output of which is sometimes 2,000,000 tons a year. The city once had large sawmills, but these declined with the depletion of the forests of the state. The few which remain manufacture rough and dressed lumber, sash, doors and boxes. Leading industrial establishments are manufactories of glass, rules, art furniture, steering gears and silos. Here are located the Pere Marquette car shops and a bean elevator, said to be the largest of its kind in the world. The city has an important wholesale trade.

In 1815 a settlement called Saginaw City was founded on the west bank of the river, and in 1849 a second settlement, East Saginaw, was made on the opposite bank. The two were consolidated as Saginaw in 1890. In 1914 the commission form of government was adopted. The waterworks are owned and operated at a profit by the city. F.A.

SAGITTARIUS, *saj i ta'ri us,* THE ARCHER, the tenth of the twelve signs of the Zodiac. About November 22 the sun in its path around the earth enters the sign of Sagittarius. The westward movement of the equinoxes has placed Pisces (the Fishes) as the first of the twelve signs, a position previously held by Aries, the Ram. Some authorities still place Sagittarius as the ninth instead of the tenth zodiacal sign. In astronomy Sagittarius is represented by the sign ♐, a dart or an arrow, and Sagitta is the name of a constellation called the "arrow" or dart. According to ancient mythology the arrow is the one with which Hercules killed the vulture which devoured the heart of Prometheus, who was chained to a rock as punishment for having stolen sacred fire from heaven. The archer Sagittarius is a centaur, half man, half horse, a son of Eupheme, the nurse of the Muses.

According to Ptolemy, there are thirty-one stars in Sagittarius, all of them small. Tycho Brahe catalogued only fourteen stars, including several variable stars. In Sagittarius the Milky Way is particularly bright.

SA'GO, a food-starch obtained from the pith of several specimens of tropical palms native to the East Indies. The sago palm grows best in low, marshy soil, and attains a height of about thirty feet. The strong trunks of these trees have a hard outer layer about two inches thick; the central portion is spongy and contains the starch product. The trees devoted to the production of sago are not allowed to come to full maturity, for the ripening of the fruit exhausts the starchy center, leaving the trunk a more or less hollow shell and causing the tree to die. These palms are therefore cut down when they are about fifteen years old, being then just ready to flower. The stems are split up and from them is extracted the starch pith, which is reduced to a powder by grating. The powder is then kneaded in water over a cloth or sieve, through which it passes to a trough, where it settles. After a few washings the sago flour is ready to be used by the natives in making cakes and soups.

Sago prepared for export, however, is given further treatment. The flour is kneaded into a dough by mixing it with water, and the mass is forced through sieves, dropping on hot, greased pans in the form of small grains. The grains vary in size, giving rise to the commercial names of pearl sago, bullet sago, etc. The heat forms a covering of paste, so that when ready for the market the sago grains are small, translucent balls. These become larger when cooked, but remain separate, never massing.

Sago is used extensively in Europe and North America for making puddings and thickening soups. The Europeans also employ it in feeding stock and in starch making. It is a nutritious and an easily digestible food; over seventy-eight per cent of its ingredients consist of carbohydrates, and it has a fuel value of 1,635 calories per pound (see CALORIE; FOOD, subhead *Chemistry of Foods*). Borneo is the largest producer of sago.

SAGUENAY, *sag eh na',* **RIVER,** an important river of Quebec, tributary of the Saint Lawrence. It is a deep, dark, gloomy stream, world-renowned for the grandeur of its scenery, particularly in its lower parts. The Saguenay issues from the eastern end of Lake Saint John, and flows for 110 miles in a general easterly direction into the Saint Lawrence, its mouth being 120 miles northeast of Quebec (see map, facing page 1096). For a distance of forty miles below the lake it is a series of rapids and cataracts, navigable only for canoes. There the river flows between hilly banks, about 400 feet high, covered with dense growths of spruce, maple and birch. At Chicoutimi it becomes navigable for small steamers and at Ha Ha Bay, six miles farther, for larger vessels. Ha Ha Bay is about nine miles long and the same distance wide, and is a noted resort for tourists and summer residents.

From Ha Ha Bay to its mouth, a distance of sixty miles, the Saguenay flows through a rocky, treeless gorge, which gradually rises to a height of 1,800 feet at the Saint Lawrence. The line of cliffs is broken here and there by narrow, green valleys, but for most of the way it casts its dark shadows over the waters. The Lower Saguenay is really a fiord or loch, rather than a river. It is from three-quarters of a mile to two miles wide, and has a depth ranging from 800 to 2,000 feet. At its mouth it is 600 feet deeper than the Saint Lawrence, into which it flows. Tadoussac, at the confluence, is a popular watering place and was the first European trading post in Canada.

Lake Saint John, from which the Saguenay issues, is a shallow body of water covering an area of 350 square miles. It receives numerous important rivers, one of which, the Peribonka, is generally accepted as the upper course of the Saguenay. From Tadoussac to the head of the Peribonka is a distance of 405 miles. Lake Saint John is famous for its *ouinaniche,* or land-locked salmon, a fish which often attains a weight of five or six pounds, and is an excellent food fish.

SAHARA, *sa hah'ra* (in Arabic, *sah'h'rah*), a vast desert in Northern Africa. It extends roughly from the Atlantic Ocean on the west to the valley of the Nile on the east, and from the Sudan on the south to the Atlas Mountains and the Mediterranean Sea on the north (see colored map of Africa, opposite page 81). Thus, it encroaches on Egypt, Tripoli, Tunis, Algeria and Morocco. Its physical limits are not everywhere as sharply drawn as they are in those parts of Algeria and Morocco where the traveler looks down from the ramparts of the Atlas range upon an undulating and limitless waste. Elsewhere the confines of the desert are often less easy to trace, being merged with the fertile surrounding territory, especially to the south. The greatest length of the desert is 3,200 miles, along the twentieth parallel of north latitude; its breadth from north to south varies from 800 to 1,400 miles. Its area is estimated at three and a half million square miles —about that of Canada, or of Europe without the Scandinavian peninsula, or nearly that of the United States, including Alaska.

Physical Features. The central plateau extends about three-fourths the distance across the desert, in a northeasterly southwesterly direction, and has an elevation ranging from 1,900 to 2,500 feet. Three mountain ranges, the Ahaggar, the Tibesti and the Air, rise above this plateau. The highest peaks have altitudes varying from 6,000 to over 9,000 feet. During the winter their summits are capped with snow. In this mountain region are numerous river valleys. The Western Sahara is a vast sand waste, and to the north and east of the central plateau is the Libyan Desert, a barren waste without animal or vegetable life, excepting on a few oases. The Libyan Desert extends to the Nile. The region between the Nile and the Red Sea is mountainous. The Sahara contains extensive regions covered with sand dunes, whose form is constantly changing under the action of the wind.

Oases. Oases occur in depressions, a number of which are below sea level. They are watered by springs that are fed by underground streams, which in turn receive their supply from water that sinks through the sand to an underlying layer of clay. The best authorities believe that by sinking wells the tillable area might be greatly extended, for the soil is fertile, and wherever water can be obtained tropical fruits, millet and other cereals may be raised in abundance. The oases are the centers of population.

Excepting on the oases, this vast region is practically without life. Few animals have penetrated to the interior, but on the borders where water is obtainable the lion, the panther, the hyena, the jackal, the fox and some species of ape are found. Venomous serpents are numerous, and in some regions the huge python makes its home.

Climate. The dry climate is due to atmospheric conditions. During the winter the winds blow outward in all directions and so bring no moisture to the country. During summer the intense heat causes the air to expand and to absorb all the moisture it receives. In summer the days are exceedingly hot, but the nights are cool. Terrific windstorms blow over the region, carrying such quantities of sand as to imperil travelers.

The People and Commerce. The Tuareg tribes control the caravan routes of the central region. Moors inhabit the Adrar region in the west, and nomad Arabs cross the northern border. Tibbus, negroes and Jews are found in the other parts. The population is sparse, the most liberal estimates placing it at 2,000,000, or less than one person to each square mile.

Caravans cross the desert from Tripoli to Zinder, Kano and other towns in Central Africa. Other routes cross the Western Sahara to Timbuktu. The chief articles of trade are silk, salt, ivory, spices, ostrich feathers and musk. G.B.D.

Consult Sommerville's *Sands of Sahara;* Haywood's *Through Timbuctu and Across the Great Sahara.*

Related Subjects. The following topics will be of interest in connection with this article on the Sahara Desert

Arid Region	Khamsin
Camel	Oasis
Caravan	Simoom
Desert	Sirocco

SAIGON, *si gohn',* one of the finest cities in Asia, the capital of the French colony of Cochin-China (which see). It lies on the right bank of the Saigon River, about thirty-four miles from the coast (see colored map of Asia, opposite page 417), and is more than six square miles in area. In 1921 the city had a census population of 72,372, of whom about 5,600 were Europeans. A garrison of over 2,000 soldiers is stationed here. Saigon exhibits a pleasing combination of Oriental charm and Western progress. The broad, regular streets and public gardens are made attractive by rows of shade trees, and the city enjoys such modern innovations as electric lighting, electric tramways, a filtering system, telegraph and postal service and railway connection with other parts of the colony. There is an excellent harbor, with accommodations for the largest ocean vessels, and in normal years over 600 ships clear the port annually. The city is a center of rice manufacture, and has also sawmills and factories for making soap and varnish. Notable buildings include the governor's palace, the town hall, a city theater and a $400,000 cathedral.

SAIL'BOAT AND SAIL'ING. Almost any small boat may be converted into a sailboat by raising a mast and attaching a sail to it. But unless a boat has great stability it is likely to be capsized by a sudden squall, and so the safest sort of sailboat for boys to go cruising

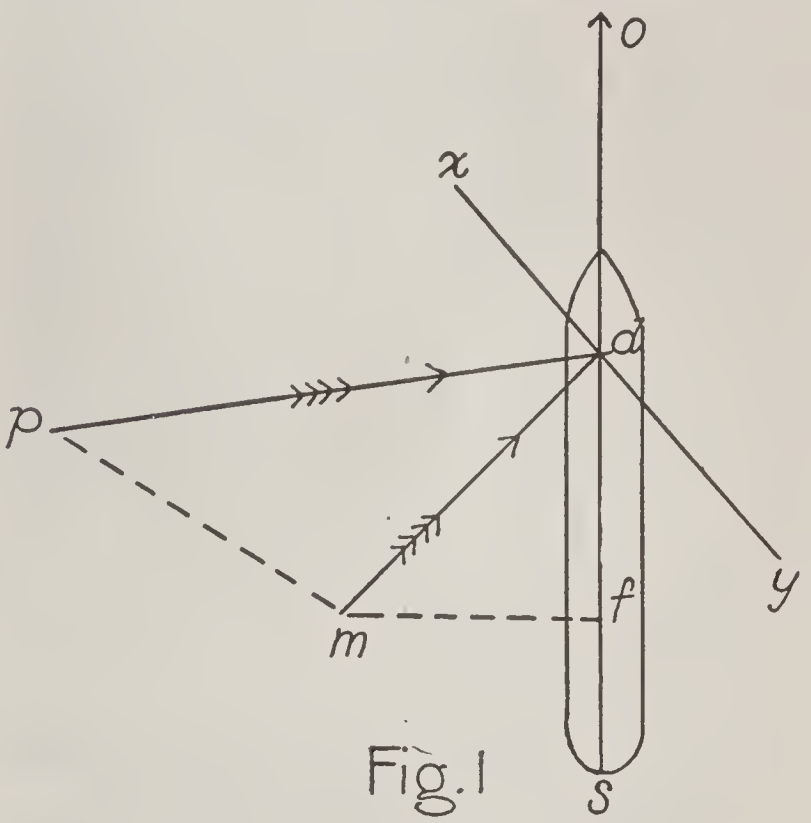


Fig. 1

Explanation appears in the text.

in is a flat-bottomed boat, or punt. A punt may be turned into a capital sailboat by boarding over the hull and finishing the inner edge of the deck with a combing, to prevent any water that may splash over the sides from flowing into the cockpit. A hole is then cut in the forward deck and a square block with a hole in the center is nailed to the bottom immediately beneath. A mast of pine or spruce wood, about three inches in diameter at the base and twelve feet high, is placed in the hole, and held in place by a wire stretching from its top to the bow of the boat. Such a mast will carry a boom fourteen feet long, on which may be spread a triangular sail eleven feet high and twelve or thirteen feet at the bottom.

The sail is attached to the mast by a number of sliding rings, and is hauled up and down by

a rope passing through a pulley at the masthead. To give steadiness to such a boat, since it has no centerboard or keel, it is necessary to use a leeboard when sailing on the wind. This is a flat board hung over the lee side (the side away from the wind) and lashed securely in place. It keeps the boat from being blown sideways. The sail may be made of twilled duck or heavy unbleached muslin, sewed by hand or on a machine. Seven or eight rings, sliding on the mast, will bring the sail up and down.

Sailing. It is easy to understand how a boat sails with a breeze behind it; it is not so easy to understand how it can be made to sail against the wind. As a matter of fact, however, a boat does not sail best with the wind straight

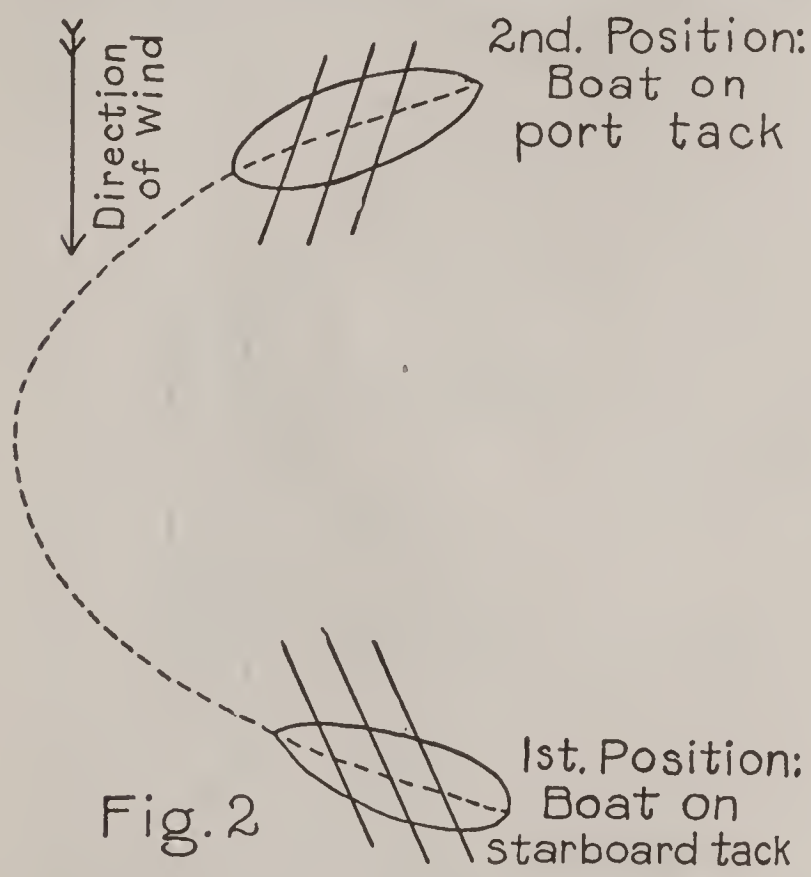


Fig. 2

Explanation appears in the text.

aft; a breeze from the side is better. The accompanying diagram (Fig. 1) will give an idea of what makes the boat go forward when the wind is on its beam. Here *xy* is the sail and *pd* the wind. The wind blowing against the slanting sail is deflected and causes a pressure, *md,* perpendicular to the surface. The pressure, *md,* can be resolved into two components, *mf* and *fd*. The former tends to push the boat sideways but is largely counteracted by the push of the water against the boat's side; *fd* is in the direction of the ship's course and propels it towards *o*.

Tacking. A vessel is said to be on the port tack when the wind is on its port, or left side, and on the starboard tack when the wind is on its starboard, or right side. When it comes up with its nose in the wind and changes from one tack to the other, it is said to be tacking. Fig. 2 shows the changed position which the sails of a vessel assume in changing from the starboard to the port tack.

In tacking, the vessel's bows are pointed towards the direction from which the wind is blowing. The sail is almost parallel with the wind and consequently falls slack. The boom is pushed across the boat, and the rudder used to turn its nose sufficiently out of the wind so there is an effective pressure against the sails in the new position. See YACHT AND YACHTING.

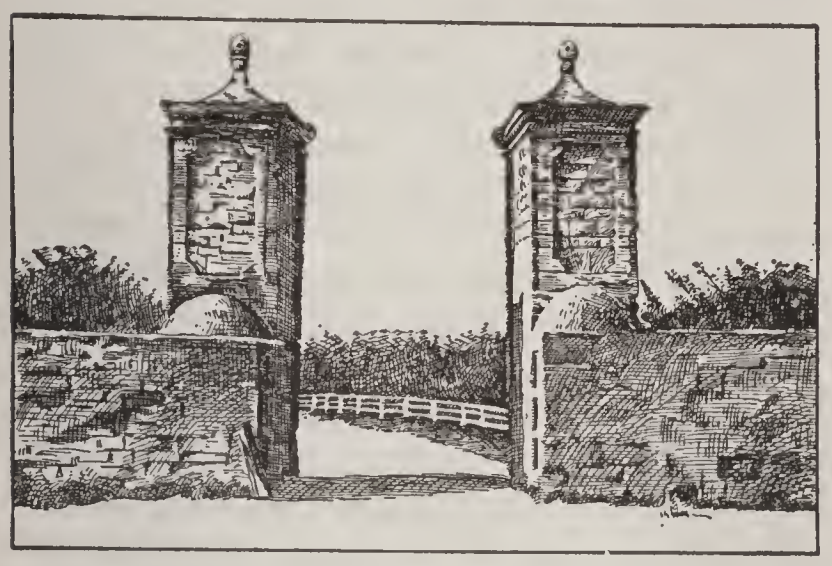
Consult Davies' *Boat Sailing for Amateurs;* Kingston's *The Boys' Own Book of Boats;* Knight's *Small Boat Sailing.*

SAINT ANDREWS, *an'drooz,* the county town of Charlotte County, New Brunswick, in the southwest corner of the province. It is on Passamaquoddy Bay, at the mouth of the Saint Croix River, and is one of the Atlantic termini of the Canadian Pacific Railway. It is about sixty miles directly west of Saint John, and forty-eight miles by rail southeast of Calais, Me. The harbor of Saint Andrews is open all the year round, and accommodates the largest vessels even at low tide. There is a large trade in fresh fish, and the canning and preserving of fish, especially sardines, is one of the chief branches of manufacturing. The only other manufactures of importance are mattresses and leather goods. Population in 1911, 238; in 1921, 236.

SAINT AUGUSTINE, *aw'gus teen,* FLA., the oldest city in the United States, is situated on a narrow strip of land between the San Sebastian River on the west and Matanzas River on the east, thirty-two miles south of Jacksonville and on the Florida East Coast Railway. The Matanzas River is really an arm of the sea separating North Beach and Anastasia Island from the mainland, and it is often called Matanzas Bay. Saint Augustine Inlet, a passage between North Beach and Anastasia Island, gives the city access to the ocean. Saint Augustine is the county seat of Saint Johns County. Its business is chiefly local. Population, 1920, 6,192.

Saint Augustine was permanently settled by the Spaniards in 1565, and it still retains many structures that date back to the first century of its existence. The city is of interest chiefly as a winter resort and because of its historic associations. The streets are very narrow, some of them so narrow that teams cannot pass each other. The city is regularly laid out, the streets running east and west and north and

south. In the center of the city is the Plaza, a small park beautifully laid out in walks, lawns and flower beds. To the west of the park is the old residence of the Spanish governors, now used for the post office. This is without doubt the oldest public building in the United States. On the north is the Roman Catholic Cathedral, built in 1793. In the belfry is a chime of bells, one of which bears the date



OLD CITY GATE

The exact date of construction is not known, but from the earliest period of Saint Augustine's history some form of gate existed, for the defense of the settlement. The existing gate was repaired and put in substantially its present condition in 1809, the year of the Peninsular campaign of Napoleon in Spain. Soon after that date the gate was closed and was not again opened for miscellaneous traffic until Florida was transferred by Spain to the United States in 1819. While nominally closed, a wicket in the gate admitted foot passengers, but men on horseback or in carts could not be admitted without permission from the guard.

1689. Within the Plaza are located the old slave market and the Spanish and Confederate monuments.

Saint Augustine is a city of palms, shrubs and flower-covered lawns. As a resort it is very attractive, and contains some of the finest hotels in America. The largest of these is the Ponce de Leon, noted for its Spanish and Moorish architecture, luxurious furnishings and beautiful grounds. Next to the Ponce de Leon in importance is the Alcazar. The Cordova and the Saint George are also well-known hostelries. Other modern structures of interest are the Memorial Presbyterian Church, the Zoryda Club and the lighthouse on Anastasia Island. The tower is 165 feet high and the light can be seen twenty miles at sea. This is a lighthouse of the first order. The island is connected with the mainland by a bridge, and an electric line enables visitors to visit the light and other points of interest, including an alligator farm and a bathing beach.

Fort Marion, on the water front north of the city, is the chief object of historic interest. It was begun in 1586 and completed in 1756. During the early period of its construction the labor was performed by slaves brought from Mexico, and native Indians, whom the Spaniards enslaved for the purpose. The walls are coquina, or shell rock. They are twenty-five feet high, and in the thickest part forty feet thick. The fort is an irregular structure covering five acres. It was patterned after the old castles of the Middle Ages and is the only fortress in America constructed on this plan. The old city gates, completed in 1727, are also of interest. They were the only entrance through the north wall, which with the moat protected the city from land invasion. S.T.K.

Consult Powell's *Historic Towns of the Southern States;* Brooks' *Unwritten History of Old Saint Augustine.*

SAINT BARTHOLOMEW'S, *bahr thol' o muze,* **DAY,** MASSACRE OF, a massacre of French Protestants which began in Paris early in the morning on the feast day of Saint Bartholomew, August 24, 1572. The massacre was the result of years of strife between the Roman Catholic and Huguenot (Protestant) parties in France. In 1570, however, a peace treaty was made, according to which Prince Henry of Navarre, a Huguenot leader and sympathizer, was to marry Margaret, the daughter of Catharine de' Medici and the sister of King Charles IX. The wedding festivities took place in Paris a few days before Saint Bartholomew's Day, and among the powerful Huguenot leaders who came to the city to attend them was Admiral Coligny. The admiral, who had considerable influence over the weak young king, roused the hatred and fear of the queen mother by attempting to draw her son away from her. Accordingly, she tried to have Coligny assassinated.

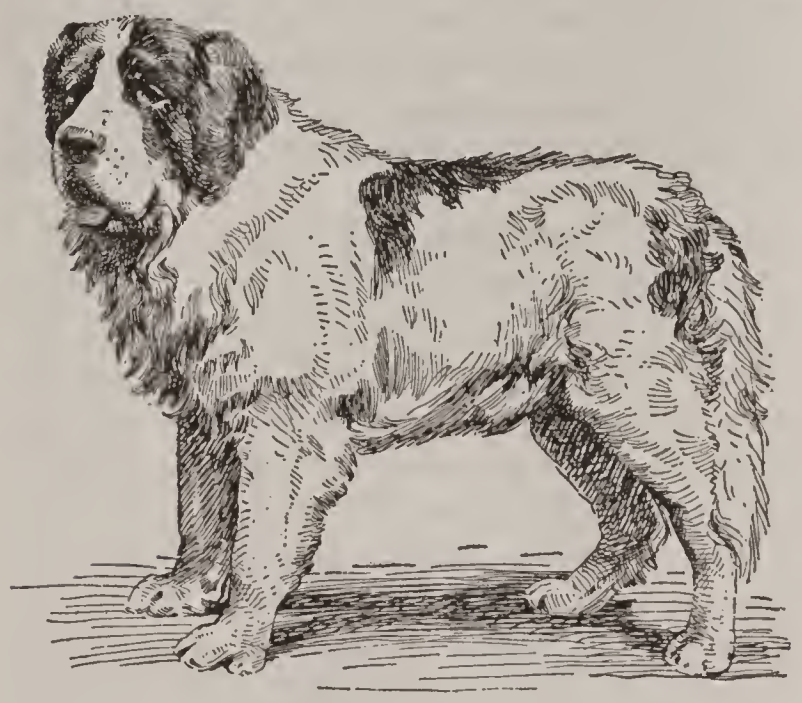
When this plot failed, Catharine, together with the Guises, uncles of the king and stanch Catholics, persuaded Charles that Coligny was a dangerous enemy and induced him to sign a decree ordering the massacre of the Huguenots. He is reported to have said, "By God's death, since you insist that the admiral must be killed I consent, but with him every Huguenot in France must perish, that no one may remain to reproach me with his death, and what you do, see that it be done quickly." A fanatical mob joined the executioners in Paris on Sunday, August 24, and the massacre was taken up in the provinces, but in many districts public sympathy was so strong that the officers of the law dared not murder their innocent fellow

citizens. The number who perished is variously given, estimates ranging from 2,000 to 100,000.

Related Subjects. The following articles in these volumes contain further information as to the Massacre of Saint Bartholomew's Day:

Catharine de' Medici	France, subhead
Charles IX	*A Period of Wars*
Coligny, Gaspard de	Guise
	Huguenots

SAINT BERNARD', a breed of large dogs developed by the monks of the monastery of Saint Bernard, located in the Swiss Alps. This hospice is situated near a dangerous pass, and its inmates breed and train the dogs to rescue



SAINT BERNARD DOG

travelers lost in the snow and ice. So keen is the scent and so remarkable the intelligence of these animals that they have been the means of saving countless lives.

The Saint Bernards are the largest of domestic dogs. Fine physical specimens are almost three feet high and weigh 150 pounds. The body is well built, erect and muscular, the back broad, the legs large and strong, the head imposing and the expression intelligent. Two varieties are seen, the smooth-coated and the shaggy-coated. The coat is usually white, with patches of black or tawny. Every day the monks send the dogs out to test passageways over dangerous chasms, trackless wastes of snow and perilous glaciers. In their rescue work they are aided by the keenness of their sense of smell, which enables them to detect a body buried under several feet of snow. A flask of brandy is usually tied about the neck of a dog for the benefit of half-frozen travelers, and the rescuers call for assistance by loud and prolonged barking. The reader will find an interesting outline for an essay on the Saint Bernard on page 1829.

SAINT BERNARD, *ber nahrd'*, GREAT, a famous pass over the Alps, now noted chiefly for the hospice at its summit. The hospice was founded in the eleventh century by Saint Bernard of Menthon and has been maintained by the Austin (or Augustinian) canons since the twelfth century as a refuge for travelers. With the aid of their famous dogs (see SAINT BERNARD) the good priests save the lives of many wayfarers in the winter months. Most of the guests in winter are Italian workmen who are too poor to pay railroad fare.

In the summer and autumn many foreigners visit the hospice. It now has accommodations for over 300 people, but nobody is ever allowed to spend longer than one day there except in the case of illness, injury or terrible winter storms. The visitor announces his arrival by ringing a great bell which hangs in the entrance hall, and before its clanging echoes have died away in the distant corridors a priest appears to ask his wishes. No payment is permitted for food and lodging, but every visitor is expected to place a contribution, according to his means, in a little box in the chapel. So severe is the life of the priests in the winter that only young men are chosen for this service. When they reach the age of thirty or thirty-five the altitude (8,100 feet) and the severity of the winter usually force the priests to retire to the mother-house at Martigny, in the Rhone Valley.

From Martigny an excellent carriage road runs over the pass to Aosta, Italy, a distance of fifty-three miles. It was by this route, then traversed only by a bridle path, that Napoleon led an army of 30,000 men with baggage and artillery to invade Italy.

Saint Bernard, Little. About fifteen miles southwest of the Great Saint Bernard is another pass, the Little Saint Bernard. At its summit is also a hospice founded by Bernard of Menthon and now maintained by the Austin canons. This pass is the easiest route by which the Alps may be crossed, and has a good carriage road. It rises to a height of 7,170 feet above the sea, and is ten miles south of Mount Blanc, the highest peak in Europe. Some historians state that Hannibal, in an expedition against Rome, crossed the Alps by way of the Little Saint Bernard. W.F.Z.

SAINT BONIFACE, *bon'i face,* a city in Manitoba, on the Red River directly east of and opposite the city of Winnipeg. Connecting Winnipeg with Saint Boniface are six bridges, the largest of which, the new Broadway Bridge,

cost $600,000. Saint Boniface is the county seat of Provencher County and the seat of the Roman Catholic archbishop of Manitoba. It is served by the Canadian Pacific, Canadian Northern (main line), and National Transcontinental (main line). It is also on the Great Northern Railway, which runs directly to Minneapolis and Saint Paul and other cities in the United States. An electric railway runs to Winnipeg, and another extends to Saint Vital, where the new buildings of the provincial agricultural college and university are located. Population in 1911, 7,483, an increase of 270 per cent over 1901; in 1921, 12,821.

Saint Boniface is steadily growing in importance as a manufacturing center, the annual value of its products being from $7,000,000 to $8,000,000. This is approximately one-fourth of the value of Winnipeg's production, and a little less than one-sixth of the total for Manitoba. The principal manufactures are meat and meat products, flour, lumber, bricks, linseed oil, paints and dyes, tar paper, sashes and doors and other building materials. One of the flour mills is said to be the largest in the British Empire, and the stockyards, which were constructed and equipped at a cost of more than $1,000,000, are probably the greatest in Canada. Hydroelectric power, supplied by the Winnipeg River, is an important factor in manufacturing.

The city has numerous religious and educational institutions. In addition to the public schools there are Saint Boniface College, affiliated with the University of Manitoba, a provincial normal school, Saint Adelard's Orphanage, the convent of the Sisters of Jesus and the Juniorate of the Oblate Fathers. The Anglicans, Methodists and Presbyterians have churches here, and the Roman Catholic cathedral, which was completed in 1908 and cost over $400,000, is the largest west of Toronto. The bells in its towers were recast from the old bells which hung in the Saint Boniface mission for half a century—those bells of which the poet Whittier wrote:

> The voyageur smiles as he listens
> To the sound that grows apace;
> Well he knows the vesper ringing
> Of the bells of Saint Boniface.

SAINT CATHARINES, *kath'a rinz,* a city in Ontario, the county town of Lincoln County. It is in the northern part of the Niagara Peninsula, on the Welland Canal, and on the Grand Trunk and the Niagara, Saint Catharines & Toronto railways. It is thirty-two miles by rail southeast of Hamilton, eleven and one-half miles north of Niagara Falls and forty-seven miles northwest of Buffalo. Saint Catharines is an important manufacturing center, its chief products being boilers, tools of various kinds, electric lamps and fittings, shoes, paper, knitted goods and biscuits. The annual output of manufactured articles has a value of more than $6,000,000 or about $400 per capita of the city's population. The county buildings, public library, municipal building and the collegiate institute are noteworthy structures. Bishop Ridley College, an Anglican secondary school for boys, is located here. Mineral springs near by have given Saint Catharines considerable fame. Population in 1911, 12,484; in 1921 it was 19,881.

SAINT CHARLES, Mo., the county seat of Saint Charles County, an important manufacturing city situated about nineteen miles northwest of Saint Louis, and on the Missouri River about twelve miles from its entrance into the Mississippi River. Transportation is provided by the Wabash and the Missouri, Kansas & Texas railroads, and an electric line extends to Saint Louis. This locality is rich in agricultural products, especially in wheat and corn. Besides a car manufactory, which employs about 1,800 men, and is one of the largest of its kind in the United States, the city has large shoe factories, engine works, grain elevators and tobacco factories. The Federal building, county courthouse, erected in 1902 at a cost of $150,000, and Saint Joseph's Hospital are prominent buildings. In addition to the public and private schools, there are Lindenwood College, for women, Sacred Heart Academy, Saint Charles Military College and a public library. The first settlement was made in 1765; it was incorporated in 1795 and was chartered as a city in 1805. The inhabitants are chiefly Americans and Germans; the population decreased from 9,437 in 1910 to 8,503 in 1920, a loss of 10 per cent. J.H.W.

SAINT CHRISTOPHER, *kris'toh fer,* or **SAINT KITTS,** *kits,* one of the Leeward Islands, in the British West Indies. It is of volcanic formation, covering an area of sixty-five square miles, with a mountain range in the center culminating in the peak of the extinct volcano Mount Misery, 4,000 feet above the sea. The climate is healthful, the soil fertile, sugar, rum, coffee and cotton being the chief products. The capital is Basse Terre, a seaport with an open roadstead. Saint Christopher, with Nevis and Anguilla, adjacent islands,

forms a political division of the Leeward Islands. The population is about 29,782.

Saint Christopher was discovered by Columbus in 1493, and was settled by French and English about 1623. The Treaty of Utrecht in 1713 awarded the island to Great Britain.

SAINT CLAIR, *klair,* a lake and a river, connecting lakes Huron and Erie, and forming part of the boundary between the state of Michigan and the province of Ontario.

Lake Saint Clair. On account of its smaller size and lesser importance, Lake Saint Clair is not named as one of the Great Lakes, though it is a link in that great system of waterways. It is roughly circular in shape, being twenty-seven miles long and twenty-five miles wide, and covers an area of 396 square miles, of which 257 square miles, or two-thirds of the total, are in Ontario. The lake's surface is six feet lower than that of Lake Huron and three feet higher than that of Lake Erie. Its average depth is only nineteen feet, but it has been dredged over its entire area so that vessels of average draft can navigate it in safety. This protection to navigation has been made necessary by the enormous tonnage of shipping that passes from Chicago, Milwaukee, Duluth and Superior to Detroit, Toledo, Erie, Buffalo and other ports. The bed of the lake is covered with a blue mud on which grows heavy vegetation, and is stocked with many kinds of fish. The lake discharges through the Detroit River into Lake Erie (see map, above).

LOCATION MAP
The lake and river, with connecting bodies of water, and cities above and below.

Saint Clair River. This is the outlet of Lake Huron, and itself flows into Lake Saint Clair through a fan-shaped delta. The river and one of the seven channels of the delta are navigable for large vessels. This channel, however, is canalized and protected by embankments; it is called the Saint Clair Flats Canal. The land on both sides of the river is low and level, especially near the delta, which forms the famous Saint Clair Flats. On the islands formed by the river's channels are numerous summer cottages and hotels. Between Port Huron, Mich., and Sarnia, Ont., at the head of the river, is the Grand Trunk Railway tunnel, which, with its approaches, is two miles long; the tunnel was completed in 1891.

SAINT CLAIR, Arthur (1734-1818), a Scotch-American soldier and statesman, the first governor of the Northwest Territory and commander-in-chief of the United States army in 1791. He was educated at the University of Edinburgh, and sailed to America as ensign during the French and Indian Wars. After taking part in the expeditions against Louisburg and Quebec, he resigned his commission and settled in Pennsylvania. Fourteen years later, in 1776, he joined the colonial army, organized the New Jersey troops and fought at Trenton and Princeton. As a reward for gallantry he was made a major-general the following year and was placed in charge of Fort Ticonderoga, but was deprived of command for surrendering to Burgoyne. Undaunted, he fought for the American cause as a volunteer, and again rose to distinction. Saint Clair was elected to the Continental Congress in 1785, became its president in 1787, and in 1789 was made the first governor of the Northwest Territory. Two years later he was sent on an expedition against the Miami Indians, as commander-in-chief of the United States army, but his forces were disastrously routed. In May, 1792, he resigned his command, and in 1802 Jefferson relieved him from the duties of the governorship.

GENERAL SAINT CLAIR

SAINT CLOUD, *kloud,* Minn., the county seat of Stearns County, is located south of the center of the state, sixty-five miles northwest of Minneapolis and 140 miles southwest of Duluth. It is on the Mississippi River and on the Great Northern and Northern Pacific railroads. Its population was 10,600 in 1910; in 1920 it was 15 873, a 50 per cent gain. Germans and Scandinavians predominate among the inhabitants. The area of the city is nearly three square miles.

Saint Cloud is popularly known as the *Granite City,* because of its immense granite deposits. Quarrying, cutting and polishing the granite constitute the leading industry; the yearly output is valued at $1,200,000. The color of the stone varies from black to light, delicate tints, and it is widely used in the construction of important public buildings. The city has also paper mills and railroad and machine shops. Electrical energy is supplied by power plants on the river.

Saint Cloud has a Federal building and a Carnegie Library, and is the seat of the state reformatory and of a state normal school, the latter equipped with buildings costing $300,000. The place was settled in 1852, and in 1868 it became a city. The commission plan of government was adopted in 1912. The waterworks are owned by the municipality. P.J.S.

SAINT-CYR, *saN seer',* Laurence Gouvion, Marquis de (1764-1830), a famous soldier, marshal of France. Born at Toul, he entered the army as a volunteer in 1792, taking a conspicuous part in the campaigns on the Rhine and in Holland. In 1798 he was sent to take command of the army in Italy, succeeding Masséna. His reorganization of the army and brilliant campaign established his reputation and in 1800 he returned to Germany and won a decisive victory at Biberach. His military ability was at once seen by Napoleon who, after employing him as ambassador to Spain in 1801, sent him again to Italy as commander of the army of occupation in Naples. The favor of Napoleon being withdrawn he resigned in 1809. For the invasion of Russia it was impossible to overlook his merits, and he was reinstated, proving the justice of Napoleon's selection by winning a brilliant victory at Polotek. In 1813, in the battle of Dresden, he was captured. At the end of hostilities he returned to France, and after the downfall of Napoleon served for two terms as Minister of War.

SAINT-DENIS, *saN' de ne',* a suburb of Paris in the Metropolitan Department of Seine, two miles north of the limits of the French capital. The town is well protected by ramparts and a fort, and is one of the outer defenses of Paris. It is noted for its beautiful abbey church, one of the finest examples of Gothic architecture in France. This church is on the site of one built in the seventh century by Dagobert I, which was used as a mausoleum for the rulers of France until the French Revolution. In 1793 the building was partially destroyed and the bodies were removed from the royal tombs, but the church was later restored to its former grandeur. Napoleon founded in Saint-Denis an institution for the free education of women who were related to the officers of the Legion of Honor. Industrially the town is important for its great annual sheep fair. The chief industrial plants are cotton and flour mills, dyeworks and bleacheries and chemical factories. Population in 1921, 76,358.

SAINTE ANNE DE BEAUPRÉ, *bo pra',* a village in Montmorency County, Quebec, on the north bank of the Saint Lawrence River, at its junction with the Sainte Anne. It is twenty-one miles northeast of Quebec, on an interurban electric railroad. It is an important lumbering center, and has about a dozen sawmills, but is better known for its famous shrine. For over two centuries Sainte Anne has been famous as a Roman Catholic shrine, and many miraculous cures are said to have been performed. The permanent population of the village is about 2,000 (1,648 in 1921), but on feast days, especially that of Sainte Anne (July 26), over 25,000 people have often been present. About 200,000 pilgrims visit the village each year.

SAINTE-BEUVE, *saNt' buv',* Charles Augustin (1804-1869), a French essayist, influential as a literary critic, was born at Boulogne-sur-Mer, and educated there and at Paris. He practiced medicine a short time, but by 1827 had written such excellent newspaper articles as to attract the attention of Victor Hugo, and the introductions to famous writers thus gained led him to devote his entire time to literature. He wrote three volumes of highly finished but rather morbid poetry and one novel, *Volupté,* showing his religious unrest; but his fame rests upon more than fifty volumes of critical and biographical articles. A warm partisan of Napoleon III, he was chosen by the Emperor as professor of Latin poetry at the Collège de France, but was so shamefully mistreated by anti-imperialist students that he resigned. His keen appreciation of the permanently good, his vast knowledge and delicate, precise style place him among the leading literary critics in any language.

SAINT ELI'AS MOUNTAINS, a broad chain of mountains, with many peaks and ridges, extending from the southeastern part of Alaska into the northwestern part of Canada. This range gives off many prodigious glaciers, the largest being the Malaspina. Owing to climatic conditions prevalent in this region it rains almost every day on the lower slopes and

snows on most days above an altitude of 4,500 feet. Mount Logan, the highest point, rises to an altitude of 19,500 feet, according to the measurements of Professor Israel C. Russell, who named the peak. Mount Saint Elias is next in height, towering 18,026 feet above the sea. The majestic beauty of the latter is best appreciated when viewed from the Pacific Ocean; the seaward slope is exceedingly steep and is covered with glaciers. It was discovered and named in 1741, by Bering, a German navigator in the Russian service, but was not explored until 1874, when the United States, which had purchased Alaska from Russia in 1867, sent an expedition to examine the glaciers encircling the mountain. The first ascent to the summit was made in 1897 by the Duke of the Abruzzi. Other peaks of the chain are Mount Fairweather, Mount Cook and Mount Vancouver.

SAINT EL'MO'S FIRE, the name given to an electrical display in the form of a circle of light sometimes seen, especially in Southern regions, during thunderstorms, about the masts of ships, at the tops of spires and trees, on the manes of horses and occasionally about human heads. Among the Greeks the phenomenon was the basis of the myth of Castor and Pollux, and was regarded by sailors as a friendly omen. See CASTOR AND POLLUX.

SAINT ETIENNE, *saN' ta tyen',* an important town in Southern France, famous for its ribbon manufactories, whose annual output, valued at about $12,000,000, is shipped to all parts of the world. The town is in the department of Loire, of which it is the capital, and is situated on both banks of the Furens, thirty-six miles southwest of Lyons. This stream furnishes the valuable water power which promotes the extensive manufactories, and its waters are peculiarly adapted to the tempering of iron and steel. The first industry of the town, sword making, was introduced in 1535. The ribbon factories are famous to-day; they contain over 30,000 looms, and the ribbons are unrivaled in beauty of design, richness and delicacy of color.

The houses in the newer part of the town are without architectural harmony. The buildings are of white sandstone, which has become dingy from the smoke of many factories. The most interesting building is the Industrial Museum, where are exhibited specimens of the manufactures and other products of the town, and minerals and fossils of the neighborhood. Saint Etienne is located on a large coal field, and about 600,000 tons of coal are mined annually. Extensive coaling establishments, blast furnaces and cutlery works are kept in constant operation, besides factories which supply most of the muskets of the French armies. Population, 1921, 167,967.

SAINT GAUDENS, *gaw'denz,* AUGUSTUS (1848-1907), the greatest of American sculptors, ranks among the world's foremost workers in the field of plastic art. Although Irish by birth, he has expressed for his adopted countrymen their feelings and aspirations in the famous *Sherman* equestrian statue, Central Park, New York City, the *Shaw Memorial,* Boston Common, and the *Lincoln* statue, Lincoln Park, Chicago.

Saint Gaudens was brought to America from Dublin when but three months old. He left school in New York City at the age of thirteen

"GRIEF"

In this monument, in Rock Creek Cemetery, Washington, D. C., Saint Gaudens "set the mark of authentic individuality on a universal emotion. This figure is worthy to rank with the work of Michelangelo."

to work for a cameo cutter, and he studied drawing at night in Cooper Institute. When he was twenty he went abroad, studying for six years in Paris and later in Rome. His earliest work was *Hiawatha,* done while he was in Rome. While in Paris in 1878 he completed the noble

Farragut statue for Madison Square, New York, and the figure of *Governor Randall* for Sailors' Snug Harbor. His work also includes *The Puritan* for Springfield, Mass.; reliefs of *Dr. McCosh* for Princeton and of *Dr. Bellows* for the Unitarian Church of All Souls, New York; the *Garfield* monument in Philadelphia; and the *Logan* statue, a conspicuous figure in Chicago's lakefront park. The great *Sherman* monument, finished in Paris in 1897, was exhibited in plaster at the Exposition of 1900.

The people of his art are human and lovable, and even the figure of *Grief* in Rock Creek Cemetery, Washington, D. C., has so little of the repellent quality of sorrow that it has often been more appropriately called *The Peace of God*. It is a bronze figure, somewhat more than life-size, seated on a granite rock against a wall of the same material. It is muffled as if in unearthly garments, but the face is visible. The right hand is raised to support the chin, and the arm is exposed to the elbow. It is a strange, sphinxlike presence—the bald, bleak statement of the essential thing—the fact of grief. It is massive and mysterious, with solemn dignity in its broad, simple lines; no name appears on the monument; no inscription of any kind.

Saint Gaudens' low reliefs are also famous for their rare charm and are rivaled in modern art only by the portraits of David d'Angiers. They include low reliefs of the Butler and Schiff children and of Miss Violet Sargent, but the best known are those of Bastien-Lepage and Robert Louis Stevenson. He was commissioned by the United States government to furnish the designs for ten- and twenty-dollar gold coins, but his designs were rejected because the centers were higher than the rims. M.R.T.

SAINT GEORGE AND THE DRAG'ON, a legend of the patron saint of England. According to the story, as Saint George was riding across a marsh he encountered a sad procession, led by a beautiful girl dressed in a bride's garments. She was the king's daughter, on her way to be sacrificed to a dragon which had terrorized the country for years. All the sheep on the land had been offered to it, and now lots were cast each day for human victims. Saint George promised the people deliverance, and charging on the advancing dragon, injured it with his magic sword Ascalon. Then he called to the princess to bind it with her girdle. The dragon became immediately weak and tame, and followed her to the market place in the city. There Saint George killed it with his magic sword, telling the people as he did so that it was done to show the power of God. The people then gave up their idols and accepted Christianity, and the princess married the knight who had rescued her. A painting of the slaughter of the dragon, by Raphael, is in the Louvre, Paris. Edward III of England made Saint George the patron of the Knights of the Garter, and a jeweled figure representing his slaying of the dragon is one of the insignia of that Order. A Russian Order of Saint George was founded by Catharine II in 1769.

SAINT GEORGE'S CHANNEL, an arm of the Atlantic Ocean which separates Southern England and Wales from the south of Ireland. It is about 100 miles long, and its width varies from 60 to 100 miles. It runs from Holyhead and Dublin to Saint David's Head, uniting the Irish Sea and the Atlantic Ocean.

SAINT GOTTHARD, *saN go tahr',* an elevated plateau in Switzerland, belonging to the Central Alps. It is broken up by lofty peaks, and has a cross valley through which passes a famous Alpine road (see subhead below). The entire area of the plateau or mountain group is 644 square miles, of which about four-fifths is Swiss and one-fifth Italian. Monte Leone, the highest peak of the group, lying east of the Simplon Pass, is 11,694 feet in height. North of it are the Waserhorn, 10,727 feet high, and the Bortelhorn, whose altitude is 10,481 feet. It is believed that the Saint Gotthard Mountains were named after a chapel of Saint Gotthard, built in the twelfth century. The plateau is connected at its four corners with the neighboring mountains by the Nüfenen Pass, Furca Pass, Lukmanier Pass and the Oberalp.

Saint Gotthard Tunnel, a railway thoroughfare through the Saint Gotthard Pass in the Alps, constructed to give direct transit by rail from Germany to Italy. Operations began in October, 1872, and the work was completed in February, 1880; at that time the tunnel was the longest in the world. It is 9¼ miles long, 26 feet wide and 21⅓ feet high. It is arched with brick and lined with rough stones. Trains enter the passage by ascending through spiral tunnels from the valley below. It connects the railways of Northern Italy with those of Switzerland and Germany and was financed by the governments of these three countries. The cost of construction is estimated at more than $45,000,000.

SAINT HELENA, *hel e'na,* a British island in the Atlantic Ocean, 1,200 miles west of the

African coast and 700 miles southeast of Ascension Island, which is the nearest land. Its chief claim to fame lies in its having been the enforced home of Napoleon Bonaparte from 1815 until his death, May 5, 1821 (see NAPOLEON I).

The island is a rugged, mountainous mass, of volcanic origin, lonely and desolate, with an area of forty-seven square miles, surrounded by forbidding cliffs rising in places to a height of 800 and 1,000 feet. The only village and port is Jamestown, a fortified place lying at the mouth of a small mountain stream which flows into Saint James' Bay, an open roadstead.

The British garrison, on which the islanders principally depended, was withdrawn in 1906, leaving the natives to their own slender resources. Great depression resulted. One-fifth of the area is available for cultivation, but a part of that is under grass and was valuable for raising cattle and sheep when the garrison offered a market. The principal crop is potatoes, which are sometimes exported. With government help factories for making fiber mats have been successfully established, and fish curing and lace making are carried on. The population consists of mixed Europeans, East Indians and natives of Africa, and numbers about 3,550.

During the South African War in 1899-1902 Saint Helena was used as a place of detention for prisoners of war, among them being General Cronje, who, after peace was declared, visited the United States.

SAINT HYACINTHE (in French, *saNt' ee a saNt'*), a city in Quebec, the county town of Saint Hyacinthe County. It is on the Yamaska River, which encloses the town in a semicircular bend, and is on the Grand Trunk, Canadian Pacific, Intercolonial and Quebec, Montreal & Southern railways, the last having direct connection with the Delaware & Hudson in the United States. By rail Saint Hyacinthe is thirty-six miles east and a trifle north of Montreal. Population in 1911, 9,797; in 1921, 10,852.

Saint Hyacinthe is an educational as well as a manufacturing center. It has the Saint Hyacinthe Academy, founded in 1811, several monasteries and convents, the Academie Prince for girls and the Academie Girouard for boys, all under Roman Catholic direction. These are in addition to the primary schools managed by the Protestant school board. A branch of the Sacred Heart College of Athabaska and the provincial dairy school also deserve mention. The latter was the first dairy school in Canada and the second in America. Of its manufacturing establishments the largest is a factory for making knit goods; it has 1,500 employees. Other important products of the city are shoes, leather, church organs, hosiery, woodenware, biscuits, gloves, corsets, shirts, farming implements and other kinds of machinery. The city owns its waterworks and electric power system; there is also a private electric power station.

Saint Hyacinthe was founded in 1775, and was incorporated as a city in 1857. It took its name from Jacques Hyacinthe Simon de Lorme, of Quebec, contractor for platforms and artillery carriages for the armies of France. He acquired a seigniory, in which Saint Hyacinthe was built, in 1753. In 1903 the city suffered a $1,000,000 loss by fire.

SAINT JEROME, *zha rome',* the county town of Terrebonne County, Quebec. It is situated at the foot of the Laurentides Mountains, on the Rivière du Nord (River of the North) and on the Canadian Pacific and Canadian Northern railways, thirty-three miles by rail northwest of Montreal. It is the most important town in the district north and northwest of Montreal, and is best known as a manufacturing center. Among its many industrial establishments are a large rubber factory, with over 500 employees, a pulp mill with 300 employees, and several creameries, a tannery, foundry, planing, carding and grist mills, and factories for making pianos, metal goods, shoes, blouses and doors. The value of all manufactures is close to $1,000,000 a year. The town was settled in 1830 and was incorporated in 1881. Since 1912 it has owned and operated its electric light and power system. Population in 1911, 3,473; in 1921, 5,491. C.L.DE M.

SAINT JOHN, the county town of Saint John County, New Brunswick, and the largest city and commercial metropolis of the province. It is on the southern shore of the province, and is picturesquely located on a rock-ribbed peninsula overlooking the Saint John River and the Bay of Fundy. It is served by the Canadian Pacific and the Intercolonial railways, whose terminal stations are among the conspicuous structures of the city. Saint John is 275 miles by rail northwest of Halifax, its rival for commercial supremacy in the Maritime Provinces. Moncton is eighty-nine miles northeast, and Fredericton, the provincial capital, is sixty-six miles northwest. Population in 1911, 42,511; in 1921, 47,166.

Saint John as a Port. The town is unique among Canadian cities in that it owns its own

harbor, which is under the direct control of the commissioners elected by the voters. The harbor and its approaches have a minimum depth, at low tide, of thirty-two feet, deep enough for the largest ship afloat. The harbor is never frozen over, a fact which has made Saint John "the winter port of Canada." In winter, when the Saint Lawrence is closed by ice, Saint John receives the larger part of the export and import trade which would otherwise go to Montreal and Quebec. Its foreign trade now has a value of $50,000,000 or more a year, a figure exceeded only by Montreal among Canadian Atlantic ports. Grain, lumber, meat and flour are the chief exports.

Saint John's high standing as a port is due in part to its natural advantages, but also to the government policy of subsidizing steamship lines. This policy was inaugurated in 1895 and was extended in 1898. There are now nearly twenty subsidized lines, the most important of which run to Liverpool, London, Dublin and other British ports. To some extent steamship service was interrupted by the War of the Nations, but will undoubtedly be increased on the conclusion of peace.

Manufactures. The city is also a distributing point for the southwestern part of the province. Much of its domestic trade is in its own manufactures, the chief of which are refined sugar, cotton goods of many kinds, brass, iron and steel products, including nails, engines and boilers, stoves and ranges, axes and other tools. Lumber milling and woodworking constitute the largest single branch of manufacturing. The value of all manufactures is about $12,000,000 a year.

Other Features of the City. There are many beautiful public buildings, including the courthouse, customhouse, armory, city hall, exhibition building and the public library, a stately structure donated in 1906 by Andrew Carnegie. Many of the private institutions are also noteworthy, especially the Y. M. C. A. building, the general hospital, the Wiggins Institution for orphan boys, and the Good Shepherd Home for girls. Conspicuous among the many fine public school buildings are the High School and the King Edward, Alexandra, Albert and Victoria schools.

Government and History. Saint John was the first city in Canada to adopt the commission form of government; this was in 1912. The common council is composed of the mayor, who is also commissioner of finance and public affairs, and four other commissioners. The charter of 1912 also provides for the initiative and referendum on legislation and for the recall of municipal officials.

On June 24, 1604, three great Frenchmen,—Champlain, De Monts and Poutrincourt—landed at what is now the Market Slip in Saint John. It was the festal day of Saint John the Baptist, for whom the city is named. The French and later the British built forts at the mouth of the river, but it was not until 1783, when 3,000 United Empire Loyalists landed at the same spot where Champlain had moored his ships nearly two centuries before, that the city was really founded. In 1877 a great fire wiped out $22,000,000 worth of property and made 13,000 people homeless. The burnt section was rebuilt at once, and the city has since grown steadily in size and prosperity. H.V.B.

SAINT JOHN RIVER, the principal river of New Brunswick. It was on the twenty-fourth of June, the festal day of John the Baptist, that Champlain and De Monts landed at this river, which they named Saint John. It has its source in a number of small streams which rise on or near the boundary between Quebec and Northwestern Maine. The headwaters of the Saint John are perhaps five miles from those of the Penobscot, which flows south through Maine, and the Chaudière, which flows north into the Saint Lawrence River. The Saint John flows northeast across Maine, and then describes a wide arc, turning first east and then southeast, for eighty miles, forming the boundary between Maine and New Brunswick. After it enters New Brunswick it continues south for about seventy-five miles, and then describes a second wide arc to the southeast, and finally empties into the Bay of Fundy. The river is over 400 miles long and drains an area of 21,500 square miles. The city of Saint John, the commercial metropolis of New Brunswick, is situated at its mouth. Fredericton, the provincial capital, Woodstock and Edmundston are other important places on its banks.

The Saint John is one of the most picturesque rivers in the Maritime Provinces, and like the Hudson River is often called the "Rhine of America." Three miles after it enters New Brunswick it plunges over the Grand Falls, a precipice seventy-five feet high; the falls are about 225 miles from the river's mouth. For nearly a mile below the falls are rapids, in the course of which the river drops another seventy-five feet. The Saint John is navigable for steamers of considerable size from its mouth to Fredericton, a distance of eighty-five miles.

Smaller steamers ascend beyond Fredericton to Woodstock, sixty miles farther, and occasionally, at high water, to the Grand Falls. Above the falls the river is again navigable for forty miles. By the Webster-Ashburton Treaty (which see) navigation is free to citizens of the United States as well as of Canada. The river provides water power for manufacturing and is also an important factor in the lumber industry.

The Reversing Falls. At Saint John, just before the river enters the Bay of Fundy, is the phenomenon known as the Reversing Falls. The river valley contracts into a narrow gorge, in which the river falls seventeen feet. At low tide the river above the gorge is twelve feet higher than the water level in the harbor; then the current is downward. At high tide, however, the harbor level is five feet higher than the river, and the current through the gorge flows upstream. Thus with every turn of the tide the rapids or falls are reversed, and only for a brief period between the ebb and flood can the gorge be passed by steamers. H.V.B.

SAINT JOHNS, the capital city of Newfoundland. It is situated at the southeastern end of the island, on the east, or Atlantic side, of the Avalon peninsula. It is the chief settlement on the island, handles the bulk of the exports and imports for the colony, and is also a manufacturer of nets, ship bread, iron and boots and shoes. Oil refining and tanning are other industries. The chief industries are all connected with the fisheries, including the whale and seal fisheries of the North Atlantic. Population in 1911, 32,292; in 1918, 34,045.

The city lies for the most part north of a large, landlocked harbor, which is visible for only a short distance from the seaside. The entrance to the harbor, the Narrows, widens from 570 feet, at the narrowest point, to 2,160 feet. On both the north and south sides are hills, which are important features in the fortifications. Around the harbor are docks, wharves, warehouses and a marine railway. Dominating the city is the Roman Catholic cathedral, perched on a hill 225 feet above the sea. There are also an Anglican cathedral and several denominational colleges (Roman Catholic, Anglican, Methodist and Presbyterian). The Parliament buildings, government house, public hospital, courthouse, market house and post office are noteworthy structures.

Saint Johns was founded in 1582 by Sir Humphrey Gilbert. It was captured about a century later (1696) by the French under Iberville, and again during the Seven Years' War, but was finally ceded to Great Britain in 1763. In 1892 a great fire destroyed property to the value of $16,000,000.

SAINT JOHNS, or **SAINT JEAN,** *zhahn,* a town in Quebec, the county town of Saint Johns County. It is situated twenty-seven miles southeast of Montreal, and is on the Richelieu River and the Grand Trunk, Central Vermont, Canadian Pacific and Delaware & Hudson railways. Saint Johns is the junction point of the Central Vermont and Grand Trunk railways, which are operated as a single system. The town has a large lumber and grain trade, and manufactures sewing machines, silks and silk thread, straw hats, umbrellas, furniture, sewer tile and wax tapers. Population in 1911, 5,903; in 1921, 7,734.

SAINT JOSEPH, Mo., the county seat of Buchanan County, is the third largest city in the state, surpassed only by Saint Louis and Kansas City. It had a population of 77,403 in 1910 and of 77,939 (Federal census) in 1920. It is in the northwestern part of the state, on the Missouri River, sixty miles north and west of Kansas City and 300 miles northwest of Saint Louis. Railroad lines entering the city are the Atchison, Topeka & Santa Fe, the Burlington Route, the Chicago Great Western, the Chicago, Rock Island & Pacific, the Missouri Pacific and the Saint Joseph & Grand Island. Electric interurban lines extend to Kansas City and to suburban towns. The area of the city exceeds thirteen square miles.

Saint Joseph is built upon a somewhat hilly site in the center of one of the most productive agricultural sections in the United States. The prominent features are the Federal building, courthouse, $300,000 auditorium, Y. W. C. A. and Y. M. C. A. buildings, the News-Press building, Scottish Rite Cathedral, Masonic Temple, Elks' Club, the First Presbyterian Church, a fine colonial structure, and other churches. Besides the public library, the city has Washington Park and Carnegie Branch libraries. The important hospitals include the state insane, the Saint Joseph, the Ensworth and the Noyes hospitals. Krug Park and Lake Contrary are attractive pleasure resorts. A fine bridge spans the river at this point.

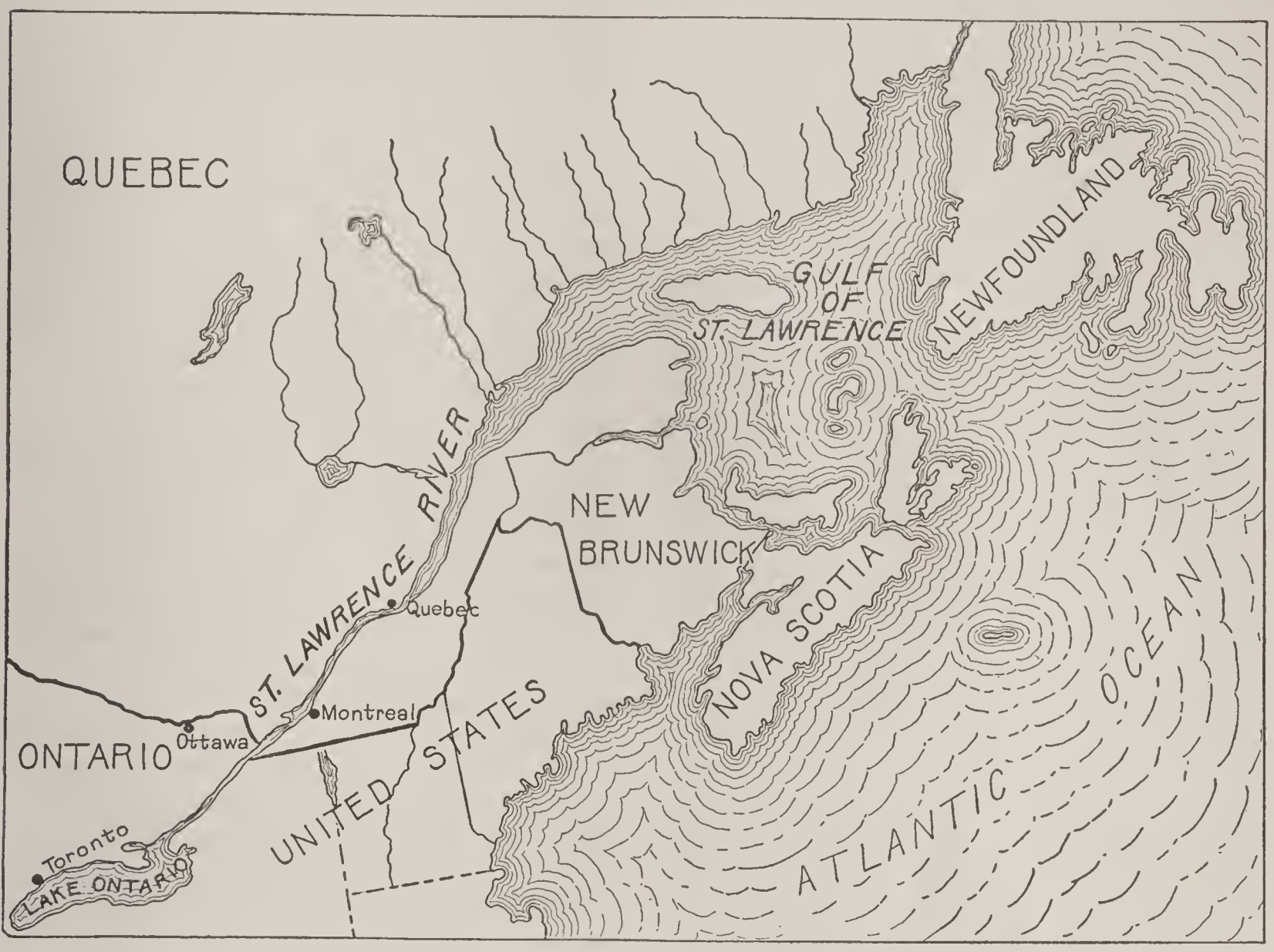
Stockyards and packing plants, the leading industrial establishments of Saint Joseph, give employment to over 4,000 workers and do an annual business worth $66,500,000. There is an important live-stock market for cattle, hogs, sheep, horses and mules, and the city manufac-

tures leather, clothing, confectionery, harness and saddles, boots and shoes. Saint Joseph is a large wholesale center and handles grain, fruits and other farm products from the surrounding territory.

Joseph Robidoux, a fur trader from Saint Louis, established a trading post on the site of Saint Joseph in 1826 and traded with Indian trappers there. He named the settlement, which was incorporated in 1845. It became a city in 1851. The commission plan of government was adopted in 1909. The electric-light plant is owned by the municipality. H.D.E.

SAINT KITTS, *kits.* See SAINT CHRISTOPHER.

SAINT LAM'BERT, a town in Chambly County, Quebec, on the south bank of the Saint Lawrence River opposite Montreal. The river at this point is about a mile and three-quarters wide, but by electric railway the distance to the center of Montreal is about three miles. Saint Lambert is served by the Grand Trunk, the Intercolonial, the Quebec, Montreal & South Shore, the Montreal & Southern Counties, the Central Vermont and is well supplied with railways. The town possess but few factories, including the very important Canadian branch for the manufacture of Waterman's fountain pens, but it is chiefly known as a residential suburb of Montreal. It has a Roman Catholic and a Protestant academy, a convent and several private schools. The town owns its water and sewerage plants, and part of the electric light and power system. From Saint Lambert a magnificent view is obtained of Mount Royal and Montreal. Saint Lambert and the vicinity are usually spoken of as the South Shore. Population in 1911, 3,344; in 1921, 3,890. J.R.B.



SAINT LAWRENCE RIVER AND GULF

SAINT LAWRENCE, GULF OF, a deep, circular inlet of the Atlantic Ocean. With the exception of the Gulf of Mexico it is the largest gulf on the North American coast. This important body of water is partly enclosed by Newfoundland on the east and Nova Scotia and New Brunswick on the south, and it washes the eastern shores of Quebec (see map, facing page 1096). As the outlet of the Saint Lawrence River and the Great Lakes, the chief highways of trade of Eastern Canada and Northern United States, its commercial importance can scarcely be overestimated. It is the gateway to the great transatlantic trade of Canada and affords the shortest route to Liverpool. By the

way of Belle Isle Strait, between Newfoundland and Quebec, the voyage to Liverpool is 2,633 nautical miles, while from New York it is 3,034 nautical miles. The gulf enters the sea by two other deep channels; these are Cabot Strait, over sixty miles wide and the largest outlet, between Cape Breton and Newfoundland, and Canso Strait, separating Cape Breton and Nova Scotia.

The gulf is crossed by cables, and many steamers ply between Quebec and the Maritime Provinces. The tides are low, but the changing currents, dense fogs and floating ice often endanger shipping. Besides Prince Edward Island in the south and Anticosti Island near the mouth of the Saint Lawrence River, there are several clusters of smaller islands, especially in the southern part of the gulf, and tiny islets fringe the bold and rocky northern shores. The large cod, herring, mackerel and smelt fisheries of the gulf have been the chief means of livelihood to a large part of the population of these islands and the mainland coast.

The gulf and river of Saint Lawrence were discovered by Jacques Cartier. On his second voyage, in 1536, he entered a bay on the north coast of the gulf on the tenth of August, the feast day of Saint Lawrence, and called it the *Bay Sainct Laurens*. This name gradually began to designate the entire gulf and river.

SAINT LAW'RENCE RIVER, a majestic stream which, with its tributaries, drains the basin of the Great Lakes and the southeastern part of Canada. Its basin exceeds 500,000 square miles in area and includes the largest body of fresh water in the world. The Saint Lawrence is the largest river of Canada, and one of the largest rivers of the world; some authorities estimate that in the volume of water discharged it is second only to the Amazon. The river begins at the outlet of Lake Ontario, whence it flows in a northeasterly direction until it enters the Gulf of Saint Lawrence, about 750 miles distant. The original source of this vast river system, however, is the Saint Louis River, which rises in the northeastern part of Minnesota and enters Lake Superior at Duluth. The Saint Mary's River joins Lake Superior to Lake Huron, the Saint Clair and Detroit rivers connect lakes Huron and Erie, and "the waters of Niagara shake the earth" between Erie and Ontario. It has been well said of the Saint Lawrence—

"The Great Lakes are its camping grounds, where its hosts repose under the sun and stars in areas like those of states and kingdoms."

The chief tributaries from the north are the Ottawa, whose dark flood enters the clear waters of the main stream at the island of Montreal; the Saint Maurice, noted for its high falls; the Montmorency, famed for its cascade, and the Saguenay, equaled by no other American river east of the Rocky Mountains in the grandeur of its scenery. From the south the Saint Lawrence receives the Saint Regis, whose sources are in the foothills of the Adirondacks; the Richelieu, the outlet of Lake Champlain; the Chaudière, whose beauty attracts many visitors, and a number of other streams of less importance.

General Description. The average width of the Saint Lawrence from Lake Ontario to Quebec is one and one-fourth miles. In some places it narrows to less than a mile, but in several places there are broad expanses forming "lakes." Lake Saint Francis, thirty miles above Montreal and twenty-eight miles long, and Lake Saint Peter, twenty miles long and about midway between Montreal and Quebec, are the most important of these. Below Quebec the channel begins to broaden into the great estuary that blends with the Gulf at Anticosti Island. Nowhere below the Isle of Orleans is the channel less than ten miles wide. At the Saguenay it has a width of twenty-five miles, and opposite Gaspe the distance from shore to shore is fifty miles.

The Great Lakes are settling basins for the streams flowing into them, and consequently the waters of the Saint Lawrence are remarkably clear and pure. There is an abundant rainfall over the entire basin, but owing to the equalizing effect of the lakes, whose level changes but little during the year, the river is not subject to sudden rises, and disastrous floods along its course, with the exception of occasional overflows in the spring due to the obstruction of the channel by ice, are unknown.

The fall from Lake Ontario to Quebec is 240 feet. Most of this is above Montreal, and between the lake and that city there are a number of rapids, whose total length is about thirty miles. The tide ascends the river as far as the Saint Maurice, where at spring tide the water may rise eighteen feet. The rise at Quebec is twenty-five feet.

From Lake Ontario to Quebec the Saint Lawrence flows through a region of low hills and fertile plains. Its valley is broad and beautiful, with now and then an isolated peak of the Laurentian or the Green mountains to break the monotony of the sky line. The elevation

of the north bank above Quebec terminates in the bold bluff upon which the city is built. Below Quebec the bluffs on the north shore merge into hills, and the hills into mountains which culminate in Cap Tourmente, towering 2,000 feet above the water. Beyond the river the mountains seem to roll into one another until they disappear on the northern horizon. The south shore is low and ascends gradually to a range of low hills in the distance.

The Thousand Islands. For a distance of forty miles after leaving Lake Ontario the river has a width of from four to seven miles, and scattered over this area are about 1,750 islands; some are several acres in extent, while others are mere points of rock. Many of the islands are private property on which wealthy Canadians and Americans have built beautiful summer homes, not a few in the form of medieval castles of most picturesque appearance. The scenery of the islands, with their precipitous rocks and shady groves, is beautiful, and the climate is healthful, offering an almost ideal resort for the summer.

The waters of the Saint Lawrence run swift and clear past the islands, which are near the famous rapids. There are large hotels, which are regularly visited by steamers. Alexandria Bay, the largest town in the park, is a noted summer resort. The islands were formed by a spur of the Laurentian highland, which extends from Ontario southward across the Saint Lawrence River into the state of New York.

The Saint Lawrence Islands Park consists of twelve reservations among the islands, which are set apart as places of outdoor recreation and rest for the public. Pavilions and open-air stoves have been provided for the convenience of campers, and caretakers see that the grounds are kept clean and attractive.

The Rapids. The descent of the river before reaching Montreal is made chiefly by a series of rapids, which are caused by the outcropping of irregular layers of rock in the bed of the stream. The most noted rapids are the Long Sault, the Cedars, the Cascades and the Lachine, just above Montreal. In each rapid the water rushes down a rocky slope and is broken into waves, whirling eddies and masses of spray. Excursion steamers make daily trips from Kingston to Montreal during the summer, and thousands of tourists experience the thrill of "shooting the rapids." Since the boat must pass through a tortuous channel at a terrific speed, the piloting of these steamers requires unusual skill and nerve. But the boats are constructed especially for running the rapids, and accidents are almost unknown. Canals around each of the rapids are used by the boats on the return voyage and also by freight boats in both directions.

Navigation. The largest ocean vessels have always been able to ascend the river to Quebec, and by dredging the shallow places in the channel the river has been made navigable for them as far as Montreal. Steamers from the Great Lakes not drawing over fourteen feet of water make regular trips to Montreal during the open season by using the Welland Canal (which see) and the canals around the rapids.

By 1922 a new project for a Great Lakes-Saint Lawrence waterway was well advanced in the United States and Canada. Where navigation is now impeded it is proposed that by a system of new canals the largest ocean vessels shall have access to lake ports, making the Great Lakes a "fresh-water Mediterranean." The scheme, if carried out, will require years to bring to completion; both countries are seriously discussing the matter. W.F.R.

History. The Saint Lawrence River was discovered and named by the French explorer, Jacques Cartier, in 1535. The Indians described it as the "river without end." Cartier extended his explorations as far as the island of Montreal, where he found the Indian town of Hochelaga. The broad channel extending westward led him to believe that he had found the much sought passage to China. W.F.R.

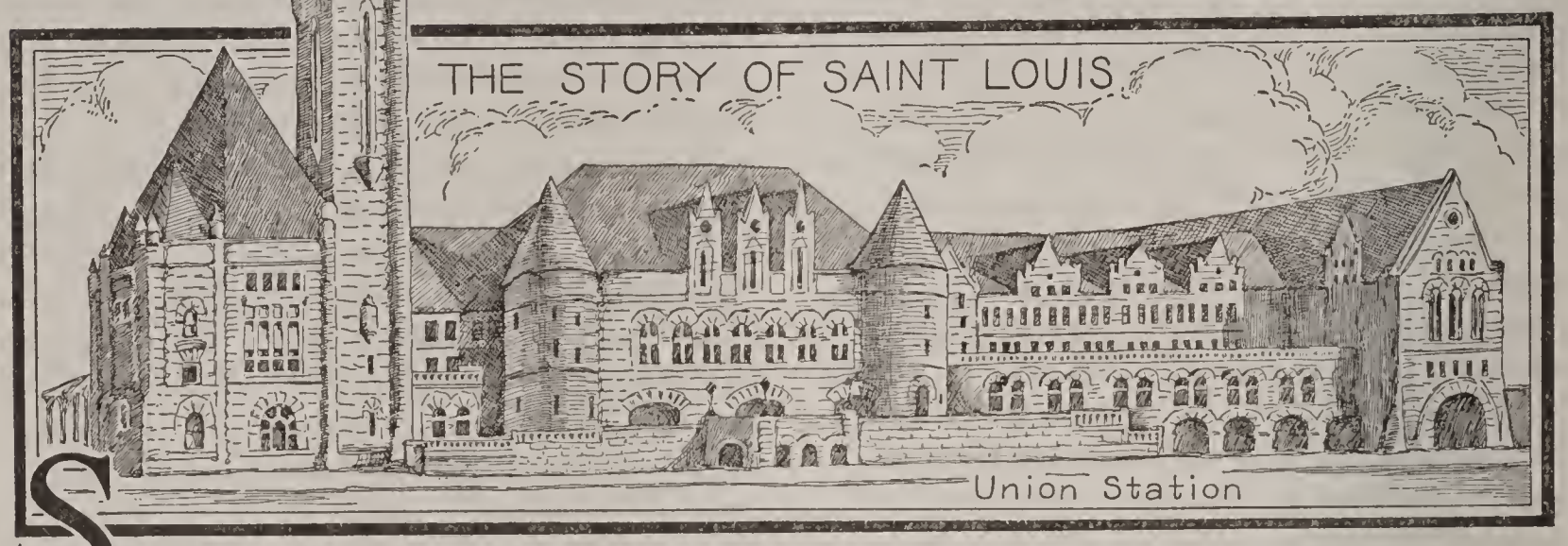
Consult Johnson's *The Picturesque Saint Lawrence;* S. E. Dawson's *Saint Lawrence, Its Basin and Borderlands.*

Related Subjects. The reader is referred to the following articles in these volumes:

Cartier, Jacques
Great Lakes
Montreal
Saint Lawrence, Gulf of

SAINT LEGER, *lej'er,* or *sil'in jer,* Barry (1737-1789), a British soldier who served in the Revolutionary War in America and in the French and Indian Wars. Entering the army in 1756, he was sent to America, served under Abercrombie and under Wolfe at Quebec. In the campaign of 1777 Saint Leger, then lieutenant-colonel, was sent with an expedition to capture Fort Stanwix with the assistance of Sir John Johnson and his Indians, and fought the battle of Oriskany against General Herkimer, who was mortally wounded in the action. A few days later General Benedict Arnold drove Saint Leger's men towards Canada in disorder, and for the rest of the war the latter confined himself to guerilla operations on the border.

Because of Saint Leger's failure at Oriskany and the flight of his men from Arnold's forces, the British campaign, as planned, had to be materially altered. The unfortunate officer was not considered by the British military authorities to be to blame for his failures; he was neither dismissed nor reduced in rank, but, on the contrary, in 1780 he was promoted to the rank of colonel. At the close of the war he was commandant of all the British forces in Canada. He published a *Journal of Occurrences in America,* which recounted his difficulties.



SAINT LOUIS, Mo., the largest city in the vast territory included in the Louisiana Purchase (which see), and the sixth city in the United States in population and in manufacturing. In 1910 it had a population of 687,029; according to the Federal census this had increased to 772,897 in 1920. Germans are most numerous in the foreign element.

General Description. Saint Louis is situated on the west bank of the Mississippi River, about twenty miles below the point where it receives the waters of the Missouri. Chicago is about 280 miles northeast, and Kansas City is about the same distance northwest. New Orleans is 709 miles south, and Saint Paul is 599 miles north. Originally the city was built on the high slope rising from the river, but this congested section is now almost wholly commercial, being occupied by wholesale, jobbing and manufacturing houses; the dwellings still remaining have been converted into tenements. An old brick house in this locality of narrow streets and time-worn buildings bears a bronze tablet which tells the passer-by that Eugene Field, the children's poet, was born there in 1850, and near by is the house in which Ulysses S. Grant, eighteenth President of the United States, was married to Julia Dent in 1848.

On Walnut Street, near the river, stands the oldest church in the city, familiarly called the *Old Cathedral;* it is the most notable relic of the French period of the history of Saint Louis. On the crest of this slope stands one of the city's most interesting landmarks, the old courthouse, built in 1839, which was a slave market before the War of Secession. It is built in the form of a Greek cross and contains four large paintings by Wimar and figures representing Law, Commerce, Justice and Liberty.

The newer and greater business district adjoins this old one on the west, and farther on lie fine residential districts, which extend into suburbs of rare beauty. The tendency of the city is to grow westward, and the greater number of the fine residential sections are on the farther West Side; there are, however, some magnificent homes on the North and South sides. More than sixty-one square miles are included in the city's area.

Parks, Homes and Boulevards. Forest Park, the largest of the city's recreation grounds, is an immense tract (1,400 acres) of great natural beauty on which about $3,000,000 has been expended in drives, lakes and landscape gardening. Here in 1904 the Louisiana Purchase Exposition was held. The park contains the Art Museum, the Jefferson Memorial Building, and a "zoo;" its golf links are second to none in the United States. Tower Grove Park, on the South Side, has beautiful drives, and statues of Columbus, Humboldt and Shakespeare. Near the statue of Shakespeare are two trees which were planted by the English actresses, Adelaide Neilson and Olga Nethersole, as tributes to their illustrious countryman. O'Fallon Park, on the North Side, has one of the largest artificial swimming pools in the United States. These three parks, with Carondelet Park, on the extreme South Side, are on a chain of fine boulevards.

The Missouri Botanical Garden, better known as Shaw's Garden, ranks first in the United States and next to the Kew Gardens, in London, as an educational botanical garden. Its library contains more than 18,500 books, 22,000 pamphlets and a considerable number of manuscript volumes. The Arboretum contains specimens of trees from various parts of the world, and an extensive collection of fruit trees and plants is housed in the Fruiticetum. This garden and Tower Grove Park were the gifts of Henry Shaw, a Saint Louis citizen, who was deeply interested in plants; his burial place in the garden is marked by an imposing sarcophagus. Lafayette, Lyon and Compton Hill Reservoir parks are among the smaller recreation spots and playgrounds. In some one of the parks a concert may be heard any night during the warm season, as Saint Louis is a music-loving community. Bellefontaine and Calvary are the largest and most beautiful of the city's cemeteries; the latter is the burial place of General William Tecumseh Sherman.

No city in the entire Union surpasses Saint Louis in the beauty of its exclusive residential districts, called "places;" the magnificent homes and spacious grounds of these sections are a tribute to the finest skill of the architect and the landscape gardener. Westmoreland, Portland, Kingsbury and Vandeventer are among the most noted of the "places," but Lindell Terrace and Longfellow, Hawthorne, Lindell and Forsyth boulevards rival them in beauty. The huge apartment buildings common to most large cities are noticeably scarce in Saint Louis, detached houses and duplex buildings being the rule.

Reference to the residential parts of Saint Louis can scarcely be made without including the handsome estates and beautiful suburbs adjoining the city on the west, which contain the homes of some of the financiers of the city; besides these, there are attractive suburbs northwest and southwest where large numbers of city workers live. East Saint Louis (Ill.), the "little sister" city, is on the opposite bank of the river. Twelve miles south of Saint Louis is Jefferson Barracks, a United States military post. At the Chain of Rocks, north of the city and on the river, the largest sand filtration plant in the United States was opened in 1915.

Buildings. Among prominent public buildings are the city hall, an imposing $2,000,000 structure in the center of Washington Park; the new municipal building, the Federal building, the main post office, opposite Union Station (the downtown branch being in the Federal building), and the Coliseum, with a seating capacity of 15,000. The new Saint Louis Cathedral, on Lindell Boulevard, is by far the most imposing religious structure; several years will be required to finish the interior marbles and mosaics, and when completed the building will have cost $3,000,000. Saint John's Methodist Episcopal, Pilgrim Congregational, First Christian Science, Second Baptist and Second Presbyterian churches and the Jewish Temple are among the modern handsome churches of the city. Christ Church (Episcopal Cathedral) is an artistic old structure containing some of the finest stone carvings in the United States. Saints Peter and Paul Church is the oldest German Roman Catholic church in the city; it was built in 1848.

The Railway Exchange building, which covers an entire square, is one of the largest office buildings in the world. Union Trust, Frisco, Century, Missouri-Lincoln Trust, Wright and Fullerton buildings, and those of the Bank of

THE METROPOLITAN DISTRICT

1. Saint Ferdinand
2. Central
3. Kirkwood City
4. Carondelet
5. Centerville
6. East Saint Louis
7. Stites
8. Canteen
9. Nameoki
10. Venice

Commerce, Third National and Boatmen's banks are among the conspicuous business structures. The hotels of Saint Louis are sufficient in number and equipment to permit the city to act as host to the largest conventions; the best known are the Stadtler, Jefferson, Planters, Warwick, Maryland, Marquette, Terminal, American and Washington. Saint Louis, University, Racquet, Liederkranz, Columbian, Mercantile and Missouri Athletic are the principal clubs of the city, the last two being in the downtown section. The Women's Club and the Wednesday Club (women's) own their respective handsome quarters. Log Cabin, Saint

Louis, Glen Echo, Florissant, Belle Rive and Sunset Inn are the prominent country clubs.

Education. The public school system of Saint Louis is not excelled by any in the Union, and it is noted for its modern, artistic buildings. There are five high schools for white children and a high school and a normal school for colored pupils. The first permanent kindergarten in connection with the public schools, and the first public kindergarten training school for teachers, were established here in 1873 by W. T. Harris, superintendent of public schools, who later became United States Commissioner of Education. Foremost among the institutions for advanced education is Washington University (founded in 1853 as Eliot Seminary), which includes Smith's Academy and Mary Institute (for girls), and has schools of fine arts, law, social economy and manual training. Saint Louis University was founded in 1829 by the Jesuits, and is the foremost school of this Order in the United States; the Christian Brothers' College, David Ranken School of Mechanic Trades, Kenrick Seminary (Roman Catholic) and Concordia Theological Seminary (Lutheran) are all schools for the higher education of men. Forest Park University, Visitation Academy, Sacred Heart Convent, Loretto Academy and Ursuline Convent are devoted to the education of young women exclusively. The city also has the Missouri School for the Blind, the Saint Louis College of Physicians and Surgeons and a number of law and medical schools. Besides the handsome new public library, which contains more than 415,000 volumes and toward which Andrew Carnegie contributed $1,000,000, there are the Mercantile Library and the libraries of the Missouri Historical Society (housed in the Jefferson Memorial Building), of the Academy of Science and the Medical Society.

Benevolent Institutions. Public charity is provided by the city dispensary, an insane asylum, a poorhouse and a municipal lodging house, and by the industrial school, a reform school for boys and girls. A juvenile court was established in 1903. Barnes Hospital, opened in 1915, is one of the largest and best-equipped institutions of its kind in the United States; it is modeled after the noted Johns Hopkins Hospital in Baltimore. Saint John's, Saint Luke's, Saint Anthony's, Jewish and Saint Ann's Maternity hospitals are the best known of a number of modern, excellently-equipped institutions. Saint Vincent's Asylum, in the vicinity, has a wide reputation for the skilled treatment of the insane.

Commerce. Through its central location and exceptional shipping facilities, Saint Louis has become a foremost commercial center in the greatest agricultural valley in the world. Before the Eads Bridge was built in 1869-1874 (see subhead under EADS, JAMES BUCHANAN), the Mississippi River was the most important factor in the commercial life of the city, and though the growth of railroad construction has caused a decline in water commerce, there is still a considerable trade with cities on the Mississippi River and its tributaries.

Communication with all parts of the country and with Canada and Mexico is afforded by the following railway lines with their connections: the Baltimore & Ohio Southwestern; Chicago, Burlington & Quincy; Chicago & Alton; Chicago & Eastern Illinois; Chicago, Peoria & Saint Louis; Chicago, Rock Island & Pacific; Cleveland, Cincinnati, Chicago & Saint Louis; Columbia & Waterloo; Frisco Lines; Illinois Central; Louisville & Nashville; Louisville, Henderson & Saint Louis; Missouri, Kansas & Texas; Missouri Pacific; Mobile & Ohio; Pennsylvania Lines; Saint Louis, Iron Mountain & Southern; Saint Louis Southwestern; Southern; Toledo, Saint Louis & Western; and Wabash. All railroad trains "back in" to the colossal Union Station, one of the largest unified passenger and freight terminals in the world, which, with its thirty-two tracks, covers eleven acres; trains from the East enter the city over the Eads' and Merchants' bridges. Electric lines communicate with adjacent cities and towns, and the McKinley interurban electric railway, which operates between cities and towns in Illinois, enters Saint Louis over the McKinley Bridge. The Municipal Bridge is in course of erection.

Industry and Manufacture. Saint Louis began its existence as a fur-trading post, and though it has attained a foremost rank in other branches of industry, it has always nurtured the first shoot of its commercial tree, and now is one of the greatest primary fur markets in the world and one of the largest fur-sale markets in the Union. The fur sale held here in January, 1917, was the largest in the history of the United States. The city has one of the greatest horse and mule markets in the world, and an equally important tobacco market. West of New York there is no greater distributing point for dry goods and shoes, and the city holds high rank as a wool and interior cotton market.

Although it is preëminently a distributing and commercial point, it ranks fourth in the

United States as a manufacturing center. Boots and shoes are now the leading manufactured products, having displaced tobacco products, which rank second. One of the largest breweries in the world is located here; its storage capacity is enormous, and its liquors are known in every country. So immense is the business of the great woodenware and hardware houses that private railway tracks are necessary for the handling of their shipments. Saint Louis is noted for its extensive manufacture of railway and street cars, clothing, furniture, baking powder, soap and candles, and the output of its flour mills and gristmills, packing houses, foundries and machine shops is also important.

History. The Saint Louis of to-day is the outgrowth of the fur-trading post established on this site by Auguste Chouteau in 1764. In the same year Pierre Laclede Ligueste, his stepfather, formed a settlement here which was first called Laclede's Village, but which soon after was renamed in honor of Louis IX of France. In 1770 France ceded all of its territory west of the Mississippi River to Spain, and Saint Louis became the capital of Upper Louisiana. One memorable day in April, 1803, the village floated three flags, when Louisiana Territory, which had been transferred by Spain to France, was transferred by France to the United States. The place grew steadily in population and importance, and in 1809 the town was incorporated. The first steamboat to visit the city was the *Pike,* in 1815. In 1819 the western branch of the American Fur Company was established here by John Jacob Astor. About this time large numbers of settlers were coming from Virginia, Tennessee and the Carolinas, and in 1822 a city charter was granted. The year 1849 is memorable for an epidemic of cholera which caused the death of 4,000 people and for a fire which destroyed property valued at several million dollars. During the following ten years the growth of the city was marvelous.

The first railroad (the Missouri Pacific) was constructed from Saint Louis in 1854. The first ironclad gunboats of the United States were built here by Captain James B. Eads in 1861. Under the *Scheme and Charter,* adopted in 1876, the city became independent of county government and taxation. Saint Louis has been repeatedly visited by fire, flood and epidemic, but the greatest calamity in its later history was a tornado, in 1896; it lasted less than twenty minutes, but in that brief time destroyed several hundred lives and swept away $10,000,000 worth of property. The great fair held in

Research Questions on Saint Louis

(An Outline suitable for Saint Louis will be found with the article "City.")

When did the city float three flags in one day, and why?

How many cities in the United States are larger than Saint Louis?

How does it compare in size with the one that ranks next above it? With the one that ranks next below it? See list in article CITY.

What great exposition was held in Saint Louis? Why was there a special fitness in having it in this city?

What well-known poet was born in this city? How is his birthplace marked?

What double disaster did the city endure in 1849?

What might you have seen in the old courthouse at Saint Louis sixty years ago that you would not see to-day?

What was the first settlement on this site named? In whose honor was the city given its present name?

What special advantage would a student of botany have in Saint Louis that he would not find in any other city in the United States?

How does the Union Station in this city rank with the railway stations of the country as to size?

What is Saint Louis's "little sister" city? How is it connected with Saint Louis?

Where may you see two trees planted by English actresses, and in whose honor were they planted?

On what part of the city site was the first settlement made? To what is that region given over to-day?

What President of the United States was married in Saint Louis?

What was his occupation later when he lived in that city?

What is the largest of the recreation grounds of Saint Louis? How does it compare in area with the largest park in Chicago?

What are the exclusive residential districts called?

Why would this city have almost as good a right as has Philadelphia to be called a "city of homes?"

What is the most imposing religious structure in the city?

Where are some of the finest stone carvings in the United States to be seen?

What very important innovations in education were introduced in connection with the Saint Louis schools?

By whom were they introduced? What position did he afterward hold?

What accounted for the early commercial prosperity of the city? Why is this factor no longer of as great importance as it was formerly?

What was the first great industry of Saint Louis?

How does the city rank to-day in this same industry?

What is the popular name for the city, and why was it given?

To how many nations has this region belonged?

When was the first railroad from Saint Louis built? What was it?

What disaster visited the city in 1896? How much damage did it do?

1904 commemorated the acquisition of Louisiana Territory by the United States. In 1914 a great historical pageant was given in Forest Park, and was attended by more than 100,000 people. The spectacular parade and ball of the *Veiled Prophet,* which have been held annually in October since 1878, attract large numbers of visitors to the city. J.D.L.

Consult Spencer's *Story of Old Saint Louis;* Stephens' *Saint Louis, the Fourth City.*

SAINT MARK'S, CATHEDRAL OF, a church in Venice, named from the patron saint of the city, Mark, the apostle. The first church on the site was built in the ninth century, when the supposed remains of the apostle were brought to Venice, but this structure was destroyed by fire, and in the tenth century a second was built. Originally this second church was a simple structure, in plan, like the modern one, a Greek cross. Gradually alterations were made and ornamentation was added, until it became what it is to-day—one of the most gorgeously beautiful buildings in the world. In the days of the republic of Venice there existed a law compelling every merchant who journeyed to the Orient to carry back something to adorn the sacred edifice; and the building as it stands is practically a museum of art.

The church faces the Square of Saint Mark's. In form, as stated above, it is a cross, 250 feet from east to west, 170 feet in greatest width; over the center there is a dome forty-two feet in diameter, and over each arm a smaller dome. In part the style of architecture is Byzantine, and the little cupolas resemble the minarets of a mosque. Five porches which open upon the Square of Saint Mark lead to five doors, over the central one of which are set four colossal horses of bronze which were brought from Constantinople in 1204.

Within the church, the decoration consists chiefly of mosaics, set in a gilded background. The vaults of the ceilings are comparatively low, and these mosaics, with their exquisite color schemes, are easily seen. The chancel screen is crowned with marble statues of Mary, Saint Mark and the Twelve Apostles, and various statues of marble or of bronze decorate other parts of the church. At certain seasons there is displayed the wonderful altar screen, accounted one of the most beautiful pieces of gold and silver work in the world. It contains hundreds of precious stones.

Previous to 1807 Saint Mark's was merely the royal chapel, but since that date it has been the cathedral of Venice.

Consult Ruskin's *Stones of Venice;* Goodyear's *Architectural Refinements of Saint Marks at Venice.*

SAINT MARYS, a town in Perth County, Ontario. It is on the Thames River, and on the Grand Trunk and Canadian Pacific railways, twenty-one miles north of London, and ninety-nine miles by rail southwest of Toronto. Saint Marys lies in an agricultural district, and its principal factories produce agricultural implements, dried fruits, butter and cream. There are large stone quarries in the neighborhood. Population in 1911, 3,388; in 1921, 3,847.

SAINT MARY'S RIVER, the stream which carries the surplus waters of Lake Superior into Lake Huron. It is about forty miles long, and forms a part of the boundary between Ontario and the Upper Michigan peninsula. A number of islands divide it into two main channels, each of which expands into several lake-like bays. Near the upper end of the river are the Saint Mary's Rapids, where there is a fall of nearly twenty feet within a mile. To avoid these rapids canals have been constructed, both on the Canadian and American sides. Though sometimes called the Saint Mary's Canals, these are better known as the Sault Sainte Marie Canals (which see). The rapids furnish power for manufacturing and are crossed by a railway bridge a mile long.

SAINT MAURICE, *mawr'is,* **RIVER,** a river of Canada, lying entirely within the province of Quebec. It rises in a chain of little lakes near the southern part of the province, flows for 300 miles in a generally southeasterly direction, and empties into the Saint Lawrence at the city of Three Rivers. For about twenty miles above its mouth it is navigable, but at that point navigation is interrupted by a waterfall 160 feet in height. Above the falls there is a stretch of seventy-five miles navigable for small boats. The scenery along the entire course, and especially in the falls region, is beautiful, and the stream is important as the means of transportation for the logs cut in the forests about its source.

SAINT MORITZ, *mo'rits,* a famous resort and watering place in Switzerland, 6,037 feet above sea level. It lies in the upper part of the great valley known as the Engadine, and is the highest village in the valley. Its permanent population is less than 1,700, but both in summer and in winter this is largely increased by the health-seekers and tourists. In the summer the visitors come from many parts of Europe and America to benefit from the

famous baths which lie about a mile south of the village. It was Paracelsus, the noted physician, who late in the sixteenth century called attention to these baths, and their fame has steadily increased. In the winter come the English, for it is not the water cure that attracts them, but the remarkable facilities for skating and tobogganing which the region affords, sports which cannot be indulged in at home. At all seasons the views from this elevated site are superb, and these are added attractions to draw visitors.

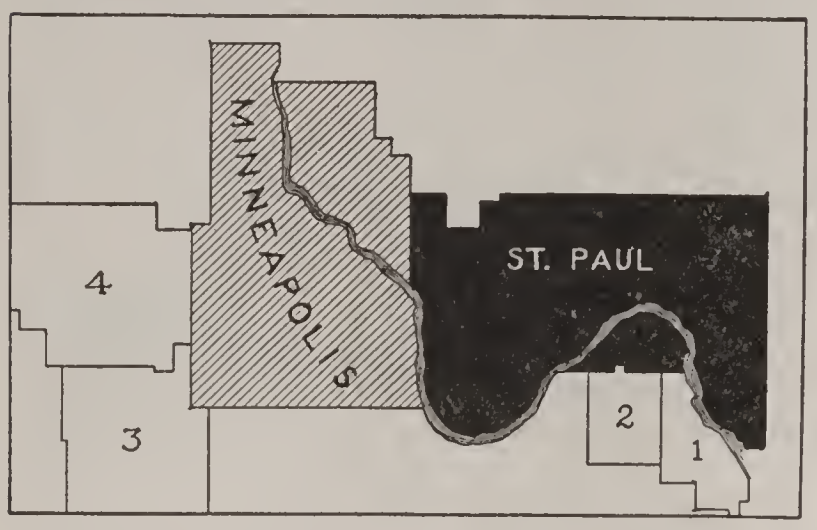
SAINT PAUL, MINN., the capital of the state and the county seat of Ramsey County, a foremost live-stock, manufacturing and jobbing center, and the United States army headquarters for the entire Northwest. It is in the southern part of the state, 400 miles northwest of Chicago, 152 miles southwest of Duluth and 1,829 miles east of Seattle. Adjoining the city on the west is Minneapolis, the state metropolis, the two being popularly known as the "Twin Cities." The Mississippi River, flowing southward through the upper part of Minneapolis and defining the southeast boundary of that city and the southwest boundary of Saint Paul, bends north and again south in two great, easy curves, along which Saint Paul is situated. Railroads entering the city are the Burlington Route, the Chicago Great Western, the Chicago, Milwaukee & Saint Paul, the Chicago, Saint Paul, Minneapolis & Omaha, the Chicago, Rock Island & Pacific, the Great Northern, the Minneapolis & Saint Louis, the Minneapolis, Saint Paul and Sault Sainte Marie, the Northern Pacific and the Chicago & North Western. The city is the center of several electric lines and there is considerable excursion traffic on the river. The population was 214,744 in 1910; in 1920 it was 234,680.

Situation and Parks. Saint Paul occupies an area of more than fifty-two square miles, on a site which rises eastward in terraces extending 266 feet above the level of the river. Summit Avenue, 200 feet wide, running north and south along the highest elevation, is the principal residence street, and it offers magnificent views of the river valley and surrounding country. On this avenue are the fine residence of the late James J. Hill and the homes of other capitalists. About 1,500 acres of the city are parked. Como Park, on the north side, which contains a large lake, is a wooded tract of natural beauty made still more lovely by landscape gardening. Rice Park, a fine square in the business portion of the city, is surrounded by some of the principal public buildings. Phalen Park, on the northeast, Fort Snelling, on the southwest (a military reservation at the junction of the Mississippi and Minnesota rivers), and Indian Mounds Park, along the Mississippi at the east end of the city, are all parts of the extensive park system. On an island midstream in the Mississippi, opposite the business section of the city, is another fine park, with free public baths and a zoölogical garden. Two large bridges cross the river at this point.

Public Buildings. The business section of the city extends along the second curve of the river. Here the dominating feature is the magnificent state capitol, a building designed by the architect Cass Gilbert. The exterior is beautified by sculptures executed by Daniel Chester French and Edward C. Potter, and the story of the state's history has been told in mural paintings by many artists, among whom are John La Farge, Edwin H. Blashfield, Kenyon Cox and Howard Pyle. The structure is built of white marble and native granite, and it cost $4,500,000.

Other prominent public buildings are the combined city hall and courthouse, which, with the sections of parking about it, occupies an entire block; a fine city Auditorium, a $1,000,000 public library, the Hill Reference Library,

the Federal building and a United States customhouse. Among a number of beautiful places of worship are the Cathedral (Roman Catholic), conspicuous because of its huge copper dome, and the People's, Park Congregational, Central Presbyterian and First Baptist churches. Commercial, religious, secret order, social and athletic organizations own and oc-



THE METROPOLITAN DISTRICT

1. South Saint Paul City
2. West Saint Paul City
3. Edina Village
4. Saint Louis Park Village

cupy club houses throughout the city. Willow Brook, one of the best-equipped state fish hatcheries in the United States, is east of Indian Mounds Park.

Institutions. The libraries and museums of Saint Paul include the public library; the library of the State Historical Society and the state law library, both housed in the capitol; the Public Art Gallery and Scientific Museum, both a part of the Saint Paul Institute, housed in the Auditorium; the Art Collection of the Minnesota State Art Society, in the Old Capitol; and a private art gallery, part of the estate of James J. Hill, containing what is considered the finest collection of the works of the Barbizon school in America. Educational advantages are offered by Concordia College (German-Lutheran), Hamline University (Methodist), Macalester College (Presbyterian), Saint Paul College of Law, Saint Thomas College (Catholic) and the state agricultural college, a part of the University of Minnesota, the main buildings of which are in Minneapolis (see MINNESOTA, UNIVERSITY OF). The state fair is an important exhibition held annually on grounds adjoining the city on the northwest.

The principal hospitals and charitable institutions are the city and county, Saint Joseph's, Saint Luke's and Swedish hospitals, the Scandinavian Orphan Asylum, Home for the Friendless, Magdalen Home and the Women's Christian Home.

Industry. Saint Paul contains some of the largest wholesale houses and the largest individual horse market in the United States, while its annual trade in cattle approximates $40,000,000. As a center of the manufacture of shoes, grass carpets, refrigerators, machinery, beer and fur goods, and as a publishing center, it holds a foremost place among American cities. Its 818 (in 1920) industries represent a capitalization of $121,561,000, and their annual output is valued at $149,638,000. The city is the port of entry for the Minnesota customs district, receiving imports sent by rail from Canada and the Orient. Imported teas are inspected here. At South Saint Paul are large stockyards and packing houses, and the city has long been an important market for furs from the Northwest. A new industry, that of the cultivation of mushrooms in caves along the river, is reaching considerable dimensions. Saint Paul is an important transfer point both for freight and passengers, and the erection of a passenger sta-

THE ROMAN CATHOLIC CATHEDRAL

tion and terminals to cost $10,000,000 was begun in 1917 to accommodate the heavy traffic. In the city are the main offices and shops of the Great Northern, the Northern Pacific and the Chicago, Saint Paul, Minneapolis & Omaha roads.

History. Father Louis Hennepin visited the site of Saint Paul as early as 1680. Traders and trappers passed over the site at infrequent intervals, and Jonathan Carver came there from Connecticut in 1766. In 1805 Lieutenant Zebulon M. Pike was sent to explore the territory acquired under the Treaty of Paris, and at this place he made a treaty with the

Sioux, obtaining from them the grant of land where Fort Snelling was built ten years later. A scattering settlement was made about the fort, and in 1841 Father Lucian Galtier and Father A. Ravoux built a small log chapel on the corner of the present Third and Minnesota streets and dedicated it to Saint Paul. The place became known as Paul's Landing and then as Saint Paul.

When Minnesota became a territory in 1849 Saint Paul was incorporated as a village and was made the territorial capital, and continued as the state capital when, in 1858, Minnesota was admitted to the Union. It had become a city in 1854. In 1914 the commission plan of government was adopted. The water supply of the city is obtained from several lakes to the north, and the mains which draw the water, which were constructed at a cost of $8,000,000, are owned and operated by the municipality. An excellent sewerage system and adequate supervision of food and public health, together with the supply of pure water, have combined to make Saint Paul one of the most healthful cities in the country. J.C.V.H.

Consult Andrews' *History of Saint Paul.*

SAINT PAUL DE LOANDA, *lo ahn'dah,* also called LOANDA, was the first settlement of the Portuguese in West Africa (1576), and is now the capital and chief city of the colony of Angola (which see). For two centuries it was the center of slave trade between Portuguese West Africa and Brazil, and at present is the center of more than one-half the trade of Angola. The chief exports are rubber, coffee, hides and ivory. The harbor entrance is obstructed by a sandbar, and large vessels unload their freight into lighters. Population in 1922, estimated to be 25,500. About 1,800 Europeans live here.

SAINT PETERSBURG, *pe'terz berg,* the name by which PETROGRAD, the capital of Russia, was known prior to the autumn of 1914, soon after the outbreak of the War of the Nations. See PETROGRAD.

SAINT PETERSBURG, FLA., in Pinellas County, is a popular winter and summer resort on the west-central coast of Florida. It is twenty-one miles southwest of Tampa, on the east coast of the peninsula which separates Tampa Bay from the Gulf of Mexico, and is served by the Atlantic Coast Line and the Tampa & Gulf Coast railroads. The city has a fine beach and harbor, recreation pier and bathing pool, a Federal building, Carnegie Library, city hospital, hotels, churches and private residences. The principal occupations are fishing, trucking and the raising and marketing of citrus fruits. The resident population in 1910 was 4,127; this was increased 245 per cent, to 14,237, by 1920, exclusive of tourists. In 1913 the commission plan of government was adopted. A.N.

SAINT PETER'S CHURCH, the largest and most imposing Christian church in the world, is situated in Rome. The approach to it is through an open space, the Piazza di San Pietro, which is elliptical in form, covers several acres and is surrounded by colonnades, or covered driveways. In the center of this piazza stands a red granite obelisk eighty feet in height, which was brought from Egypt in the days of Caligula, but was not erected here until the sixteenth century, when the church was in process of construction.

The building of Saint Peter's was a slow process. Constantine the Great built a basilica on the site and dedicated it to Saint Peter, and all through the Middle Ages this was preserved. In the fourteenth century it showed signs of decay, however, and plans were made for rebuilding. Not until the sixteenth century was the structure begun, and then the plans were entirely changed. Bramante, the first architect employed, designed the building in the form of a Greek cross with a dome, and although the architects who succeeded him made changes, Michelangelo, who took charge of the work in 1546, followed more nearly the original plan. During the eighteen years that the work was in his hands great progress was made, and the smallest details of the great cupola were worked out, so that the architects who came after him had little difficulty in completing his designs. One important change was made in the plans by an architect who took charge early in the seventeenth century—a change for the worse. Of the original Greek cross he made a Latin cross, with the long arm in front; and this huge extension hides the dome of the building unless the spectator is a full half mile away. Not until 1626 was the building finished and dedicated.

Within, the proportions are such as to be almost startling. The length is 613 feet, the width eighty-seven feet, and the dome rises to a height of over 400 feet. About the walls there are altars, chapels, tombs and innumerable works of art; while beneath the center of the dome rises the high altar, at which only the Pope or a specially authorized cardinal may officiate; and above this towers the great bronze canopy, ninety-five feet in height. The total

cost of the building is estimated at about $50,000,000, and over $30,000 are spent each year in caring for it and keeping it in repair. There was considerable difficulty in raising the vast sum needed to complete the building.

Consult Barnes' *Saint Peter in Rome and His Tomb on the Vatican Hill.*

SAINT-PIERRE, *saN pyair',* a French island colony, forty-seven miles off the south coast of Newfoundland, with a total area of ninety-three square miles. Saint-Pierre, Miquelon and Ile-aux-Chiens comprise the whole colony, which is administered by a governor and represented in the French chamber by a deputy; it represents all that remains to France of its once enormous possessions in North America.

The islands are chiefly important as the center of the French cod fisheries, which employ about one-half of the inhabitants. Saint-Pierre, the capital, has steamboat communication with Halifax and Boston, and cable connection with America and Europe. After changing ownership several times, the islands were finally returned to France in 1816.

SAINT-PIERRE, Jacques Henri Bernardin de (1737-1814), a French critic and novelist, famous as the author of the novel, *Paul and Virginia,* was born at Havre. He was educated for the profession of civil engineer, and between 1761 and 1765 traveled through Germany and Russia and did sufficient work in his profession to keep him from starvation. He next served as a government officer on the Isle of France, or Mauritius, but his whole interest in life was the study of nature, and he resigned the position after three years.

His first book, *A Voyage to the Isle of France,* appeared in 1773, in Paris, and was simply and charmingly written and full of reverence and sympathy. Rousseau, who believed but little in religion, admired the work for its naturalness, and the powerful Bishop of Aix, who was certainly the opposite of Rousseau, admired it for its reverence. The Bishop procured Saint-Pierre a yearly pension of two hundred dollars from the French Government, and with this income, the author set about the pleasant task of writing his *Studies of Nature.* In 1779 he wrote as a supplement to this work his famous *Paul and Virginia,* recognized as one of the great masterpieces of descriptive fiction. The plot, dealing with the childhood of a boy and a girl in an ideal park or woodland, is very light, but the sentiment, the vivid descriptions and the tone of innocence and purity make the story one of the most touching in all literature. The book had much influence in shaping French fiction in simple and natural style, and has been translated into the language of every civilized nation.

SAINT-QUENTIN, *saN kahN taN',* a manufacturing town in Northern France, in the department of Aisne, situated about eighty-seven miles northeast of Paris, on the Somme River. It was the scene of two famous battles: the first was fought in 1557 between allied Spanish and English troops and the French, the latter being defeated; the other occurred on January 19, 1871, when the town was captured by the Germans. The town is in the battle zone of the War of the Nations, which set Europe aflame in 1914. One of the finest Gothic cathedrals of France, built in the twelfth century, is located at Saint-Quentin. Population, 1911, 55,570.

The Saint-Quentin Canal, one of the main arteries of trade in Northeastern France, in territory held by the Germans in the War of the Nations, was partly wrecked by the invaders in August, 1917. It is seventy-five miles long, and unites the Seine and Somme rivers.

SAINT-SAËNS, *saN sàhN',* [Charles] Camille (1835-1922), a French composer, was born in Paris. He began the study of music almost as early as his first lessons in reading and writing, and at the age of seven was taking advanced piano instruction. Five years later he was allowed to enter the Conservatory of Paris and before he was sixteen years old had won both the first and the second prize in organ playing. He was scarcely eighteen when he received the important position of organist in the Church of Saint-Merri, Paris, and in 1861 was granted one of the most responsible musical offices in all Europe, that of organist in the Madeleine Church of Paris.

In 1863 the Society of Saint Cecilia of Bordeaux gave his overture, *Spartacus,* first honors, and in 1867 the authorities of the International Exhibition at Paris awarded him the prize for his cantata, *Noces.* These honors, together with deserved fame as a pianist, came to him before his thirty-second birthday, but it was not until 1872 that Saint-Saëns was able to have an opera accepted. Even then this first effort, *The Princess,* was not successful, and others that followed it met with little favor. In 1877, his Biblical opera, *Samson and Delilah,* was produced at Weimar, and its popularity has steadily increased from that first appearance. But Saint-Saëns will always be better known for his beautiful symphonic poems,

such as *La danse macabre* and *Phaéton,* and his graceful, brief compositions for the piano.

SAINT-SIMON, *saN se mawN',* CLAUDE HENRI, Count de (1760-1825), a noted French socialist, born in Paris and educated under the direction of D'Alembert. He took part in the Revolutionary War in America, doing good service in the campaign against Cornwallis. During the French Revolution he approved of the abolition of titles, and though he took no active part in any of the movements, was imprisoned for a time. His ambition from youth up was to do something to benefit mankind, and after the Revolution, with the aid of the fortune which he had amassed by buying and selling the estates of the émigrés, he set about experimenting as to the exact form his uplift movement should take. He lost all his money, and until his death was supported by a pension allowed him by his family. His doctrines met with but a cold reception at first, but before he died had won a few enthusiastic converts, among whom was Auguste Comte.

Saint-Simon stood for the necessity of a complete reorganization of society, with industry as its basis and science as its guiding principle. Every one, in his ideal state, should be obliged to work, and each should receive rewards commensurate with his labor. Especially was the law of inheritance to be abolished. The disciples of Saint-Simon elaborated his teachings into the socialistic system known as Saint-Simonianism. Among the works in which his ideas were set forth are *Reorganization of European Society, Industry, The Industrial System* and *New Christianity.*

SAINT SOPHIA, *so fe'a,* the most important and imposing structure of Constantinople, is one of the oldest buildings in Europe and the largest Mohammedan mosque in the world. The present structure was erected as a Christian church by the Roman Emperor Justinian the Great, who brought it to completion in 538. It is related that Justinian was so impressed by its splendor that he exclaimed, "O Solomon, I have surpassed thee." The building is a rectangle and its exterior is disappointing, but its beautiful interior makes it architecturally one of the wonders of the world. (An interior view of the structure is shown on page 325, in the article ARCHITECTURE.)

The interior, 250 feet from east to west and 235 feet from north to south, is divided by two piers and eight columns into a nave and aisles. Over the center of this great hall of worship rises the dome, the most impressive feature and crowning glory of the structure. The dome is 180 feet high and 107 feet in diameter, and is supported on four arches, each having a span of nearly 100 feet. The arches rest upon eight porphyry columns arranged in pairs at the four corners of the nave. In the base of the dome are forty-six arched windows, through which the edifice is lighted. From the cornice of the dome a half dome extends east and west, and this in turn rests on three smaller and lower half domes which extend to the entrance. Thus the great central hall of worship is completely covered by a dome-shaped roof which "swells larger and larger and mounts higher and higher, as though a miniature heaven rose overhead."

The Roman Empire was searched to find columns, alabasters and precious ornaments for this magnificent temple. The walls are lined with marbles of various hues, arranged in beautiful designs. The vaulting is set with glass mosaic of the finest Byzantine workmanship. On the capitals of many of the columns are monograms of Justinian and the Empress Theodora.

In 1453 the Turks captured Constantinople and converted the Church of Saint Sophia into a Mohammedan mosque. Every Christian emblem was torn from the walls or covered with whitewash, and minarets were erected at each of the four corners. Nevertheless, even with so much of its glory obscured, the interior of Saint Sophia produces upon the observer an effect unequaled by that of any other building in the world.

SAINT STEPHEN, *ste'ven,* a town in Charlotte County, New Brunswick, in the southwest corner of the province. It is at the head of tidewater on the Saint Croix River, which here forms the boundary between the United States and Canada. Saint Stephen is one of four adjacent towns at this point, the other three being Milltown, N.B., Milltown, Me., and Calais, Me. These four communities have their public utilities in common; a single street railway system, gas and electric systems and waterworks serve all four. The four fire departments respond to alarms on both sides of the river. The population of these four towns is about 15,000. Population of Saint Stephen in 1911, 867; in 1921, 829.

The town is served by the Canadian Pacific and New Brunswick Southern railways, and at Milltown, Me., two miles away, has connection with the Main Central Railway. The Saint Croix River carries a large traffic in lumber, fish, coal and general merchandise. Saint Stephen is not merely a distributing point, but a

manufacturing center, and at least two of its products, confectionery and soap, are advertised everywhere in Canada. Lumber, tools, fertilizer and shoes are the other manufactures of importance. Milltown, N. B., adjoining Saint Stephen, is noted for its production of fine colored cotton goods. F.P.G.

SAINT THOMAS, a city in Ontario, the county town of Elgin County. It is one of the most important railway centers in Southern Ontario, being almost equally distant from Toronto and Detroit. It is served by the Canadian Pacific, Grand Trunk, Pere Marquette, Wabash and Michigan Central railways. By rail Saint Thomas is 119 miles southwest of Hamilton, 123 miles west of Buffalo, and 121 miles southwest of Toronto. As a division point on most of the railroads which enter it, its chief industrial establishments are railroad shops. Its manufactures are worth over $4,000,000 to $5,000,000 a year. The courthouse, collegiate institute and the public hospital are noteworthy buildings. Population in 1911, 14,054; in 1921, 16,026.

SAINT THOMAS, an island in the former Danish West Indies, now named Virgin Islands of the United States, thirty-six miles east of Porto Rico. Saint Thomas is of chief interest because of its location. Situated as it is in the path of ocean liners, it has become a coaling station of great importance, a fact that was recognized by the United States when in 1917 it purchased the entire group of Danish islands (see VIRGIN ISLANDS OF THE UNITED STATES).

Saint Thomas has an area of thirty-three square miles. The island has commercially declined since the abolition of slavery, labor being hard to obtain for the sugar plantations. The principal product has been rum, but demand for this is on the decline. The climate is hot, and earthquakes are frequent. The capital and chief town is Charlotte Amalie. In 1918 the population, consisting chiefly of the descendants of freed slaves, was 10,191.

SAINT VIN'CENT, a mountainous island in the British West Indies, a part of the Windward Colony, has an area of 133 square miles, half of which is still covered with forests. The valleys are fertile, although eruptions of the volcano Soufrière have twice devastated considerable portions of the island. Until 1796 it was the stronghold of the warlike West Indian Caribs, who still hold a small reservation.

The climate is healthful, with an abundant tropical rainfall. The chief products are arrowroot, cocoa, cotton, fruits and spices. Since the abolition of slavery, labor has been so hard to obtain that the sugar industry has steadily declined, a fact also true of neighboring islands in the archipelago. The capital is Kingstown, a picturesque town with a population of 4,574; the total population of the island is 44,450, mostly negroes, descendants of freed slaves.

SAINT VI'TUS'S DANCE, or **CHOREA,** *ko re'a,* a nervous disease that most commonly attacks children between the ages of five and fifteen, especially girls. It is characterized by muscular jerkings of the face, neck, arms, hands, and various other parts of the body, and may be brought on by overstudy, worry, lack of outdoor exercise, late hours, fright and shock. The exciting agent is a germ or toxin that affects the brain and spinal cord, and the disorder is frequently associated with diseased tonsils or rheumatism. While Saint Vitus's dance in its ordinary form is seldom fatal, an attack may last from six weeks to six months, and the disease tends to recur if proper precautions are not taken. Rest, nutritious food, relief from worry or mental exertion and cold baths are among the hygienic measures used in combating the disorder. Physicians also prescribe tonics. Any child afflicted with Saint Vitus's dance should be taken out of school (see EDUCATION, subhead *Saint Vitus's Dance,* page 1947).

The term *chorea* is derived from a Greek word meaning *dance;* the other and more common name has come into use through associating the disease with a form of hysteria which prevailed in Central Europe in the sixteenth century, cures for which were sought at the shrines of Saint Vitus.

SAKHALIN, *sa Ka lyeen',* an island off the southeastern coast of Siberia. The part north of 50° belonged to Russia until December, 1914, the southern part to Japan. During the progress of the War of the Nations Russia ceded its northern portion to the latter country, giving Japan ownership of the entire island.

It is divided from the Maritime Province by the Strait of Tartary, about five miles wide, and the Strait of La Pérouse separates it from Yezo, the most northerly island of Japan. The island covers an area of 27,823 square miles, and has a mountainous surface. Of the geological formation little is known, but there are extensive coal fields, some of which are mined. Timber of good quality is exported.

The climate is not suited to agriculture, and there is very little land under cultivation. The fisheries provide the chief occupation and the

staple food of the inhabitants. Fur-bearing animals are numerous and valuable. Russians yet live in the north, and are mostly convicts and exiles, the island having become a Russian penal settlement in 1869. The total population is estimated at 56,450. The chief towns are Dui, Rykovskoie, Korsakova and Muravievski. See map, facing page 417.

SALABERRY-DE-VALLEYFIELD, *sal' a ber i deh val' i feeld,* popularly known as VALLEYFIELD, a city in Beauharnois County, Quebec. It lies at the foot of Lake Saint Francis, which is an expansion of the Saint Lawrence River, and is the western terminus of the Beauharnois Canal, by which steamers avoid the rapids or "Cascades." The city is served by the Grand Trunk and New York Central railways, and is eighty-four miles by rail east of Ottawa and forty-three miles southwest of Montreal. Population in 1911, 9,449; in 1921, 9,215.

Valleyfield is noted chiefly for its manufactures; its largest establishment, a cotton mill, employs nearly one-half the total population. Other large mills and factories produce paper, bronze powder, flour and cigars. Situated as it is on two trunk lines of railway as well as the greatest navigable waterway in Canada, the river also producing abundant water power, Valleyfield has advantages for manufactures. The city owns its aqueduct and street-lighting plant, but power is furnished by private companies.

The city is the seat of a Roman Catholic bishop, and the magnificent $500,000 cathedral is its most conspicuous building. Also noteworthy are the post office and customhouse, completed in 1908 at a cost of $150,000, and the courthouse, which cost about $75,000. A normal school, a classical college and two academies, one French and one English, are included in the city's educational institutions. Valleyfield was settled in 1874, and was incorporated as a city in 1904. L.J.B.

SAL'ADIN (1137-1193), a powerful sultan of Egypt and Syria, who rose from a soldier of the shepherd tribe of the Koords to be vizier to the caliph. On the caliph's death he usurped the throne and greatly widened his borders by wars. His capture of Jerusalem, in 1187, caused consternation throughout the Christian world, giving rise to the Third Crusade (see CRUSADES). Saladin was compelled to surrender the stronghold of Acre to the crusading armies, in 1191. For two years they contended with him for the tomb of Jesus, but without further success than the securing of a truce of three years, during which time pilgrims should be allowed to enter Jerusalem. The armies then withdrew. The next year Saladin died, and his empire rapidly weakened under the rule of his jealous and intriguing successors.

SAL'AMANDER, a small animal belonging to the same class as the frog, toad and newt (see AMPHIBIANS). Salamanders and newts form one order of amphibians, differing from frogs and toads in their possession of a tail (see NEWT). The body of a salamander is elongated, resembling that of the lizard in general form, and there are four sprawling legs. One of the best known species is the *spotted salamander* of Central and Southern Europe, so called because of its conspicuous black and yellow markings. It is from six to eight inches long and has a smooth, shiny skin, covered with glands and pores from which exudes a sticky substance believed to be poisonous. The animal is found in moist places in forests and mountains, and feeds on snails, worms and insects. A common American species, found both in Mexico and the United States, and often seen in aquariums, is the *axolotl,* a salamander with a velvety black skin. Some species live in dark caves far below the earth's surface, and are blind and have white skins.

Salamanders breed in the water. The young are sometimes brought forth alive and sometimes hatch from eggs laid in the water. The young tadpoles breathe by external gills, which are retained for a considerable time. The young of the axolotl sometimes breed while tadpoles, and in rare cases this immature stage lasts for years. The *giant salamander* of China and Japan lives entirely in the water and has both lungs and gills in the adult stage.

SAL'AMIS, an island of horseshoe shape, belonging to Greece, situated in the Gulf of

LOCATION MAP
Salamis and its geographical relation to Athens.

Aegina, off the coast of Attica, and due west from Athens. It is barren, rocky and mountainous, covering an area of thirty-six square miles, with a population of about 4,600. The

valleys yield a little grain, olives and grapes. The commercial importance of Salamis is very slight, but its ancient history is interesting and notable. The narrow strait between the northeast of the island and the coast of Attica was the theater of a desperate and decisive naval battle between the Greeks and Persians, 480 B. C., the Persians, although superior in numbers and size of vessels, being completely routed, over 200 out of about 750 vessels of Xerxes being destroyed. The valiant Greeks had only 375 triremes in the battle. See ATHENS.

SAL AMMONIAC, *sal a mo'ni ack,* a compound of chlorine and ammonia, the chemical name being *ammonium chloride.* It is prepared in large quantities by distilling the liquor of gas works, which contains a large proportion of ammonia. In its crude form sal ammoniac is a dirty white solid, but when purified it forms fibrous white crystals. Crude sal ammoniac is employed extensively in charging Le Clanché batteries (see ELECTRIC BATTERY), for cleaning surfaces to be soldered, in the manufacture of galvanized iron and in the textile industries. In a pure state it is used as a remedy for bronchitis, pneumonia and some stomach disorders. It dissolves readily in water, to which it imparts a salty taste.

SAL'ARIES OF RULERS. See CIVIL LIST.

SALARY, *sal'ar i,* **GRAB,** in United States history, the popular name of an act passed by Congress in 1873, which provided that certain increases in salary previously granted Senators and Representatives were to date from 1871. The general indignation aroused by this specimen of back-pay legislation caused the repeal of the act, and the next year the salaries of the Congressmen were reduced to the original figures—from $10,000 to $5,000 for Senators and from $7,500 to $5,000 for Representatives. The act grew out of the agitation for larger salaries for United States officials. When Congress raised the salaries of its own members it increased also the compensation of several other officers; the President's salary was raised from $25,000 a year to $50,000; that of the Chief Justice from $8,500 to $10,500, and those of the Vice-President, Associate Justices and Speaker of the House from $8,000 to $10,000. By the final act all of these salaries were reduced to the original figures except those of the President and Justices.

SALAYER, or **SALEYER,** *sah li'er,* **ISLANDS,** a group of islands in the Dutch East Indies, with an area of 270 square miles. They are of coral formation, covered with a wonderfully fertile soil, and the large forests contain valuable timber. The island of Salayer itself occupies 250 square miles, the remainder of the group being mere islets. The inhabitants, who number about 80,000, are chiefly Malays, embracing the Mohammedan religion, their chief occupation being fishing and making trepang.

The island exports tobacco, indigo, cotton and potatoes, and is noted for its breed of horses. Salayer is in frequent communication by steamer with Celebes. Native chiefs rule the islands, subject to the Dutch government.

SALE, BILL OF. See BILL OF SALE.

SA'LEM, MASS., one of the two county seats of Essex County, situated in the northeastern part of the state, seventeen miles northeast of Boston, on a peninsula formed by two inlets of the Atlantic Ocean, the South River and the North River. The latter separates it from Beverly. Salem is a city of many interesting historic and literary associations. It was the original settlement of the Bay Colony, and the birthplace of Nathaniel Hawthorne. The city is served by the Boston & Maine Railroad and by electric interurban lines. The population was 43,697 in 1910, and 42,515 (14th census) in 1920. On June 25, 1914, the city was partially destroyed by fire; the property loss exceeded $12,000,000, and about 15,000 people were made homeless. The area of Salem exceeds eight square miles.

Special Features. Throughout the colonial period Salem was a place of importance, and until about 1860 had an extensive foreign trade with Europe, Africa, China and India. The museum of the Peabody Academy of Science, which was founded in 1867 by a gift of $140,000 from George Peabody, contains many interesting relics of the South Seas, Japan and the East Indies and of the merchants and merchantmen connected with the early commerce. Other interesting features of Salem are the Essex Institute, occupying several buildings and containing a valuable library, historical relics of New England and a number of fine paintings; the Athenaeum with its excellent library; and many fine old dwellings dating from the Colonial period. Among the latter are the house where Hawthorne was born, the Witch House and the House of the Seven Gables, all built in the second half of the seventeenth century.

Buildings and Parks. Salem has the old customhouse (completed in 1819) in which Hawthorne worked as surveyor of the port from 1845 to 1849, three courthouses, a city hall, an

armory and a public library established by the bequest of Captain John Bertram. The charitable and beneficent institutions include the almshouse, hospitals and asylums, and homes for the aged. The parked areas of the city comprise about 400 acres and include Washington Square, or the Common, in the center of the town, and Gallows Hill, Highland, Mack, the Willows and Forest River parks.

Industry. The principal industries of Salem are the manufacture of boots and shoes, leather, foundry and machine-shop products, brass, bronze and copper products and printing and publishing. The products of 153 industries have a total annual value of about $30,000,000. Salem is an important reshipping port for coal.

History. Salem, originally called Naumkeag, was founded in 1626 by Roger Conant and his associates, and was the first settlement in Massachusetts after Plymouth. In 1628 John Endicott arrived with another group of settlers and a charter under which he organized the town. Roger Williams, a close friend of Endicott's, was pastor of the Congregational Church from 1634 to 1635. Perhaps Salem is best known as the scene of the witchcraft delusion, which raged in 1692 (see WITCHCRAFT). In 1774 the First Provincial Assembly of Massachusetts met in Salem, and declared the independence of the colony. Salem became a city in 1835. Among its many distinguished citizens have been Alexander Graham Bell, Joseph E. Worcester, dictionary-maker, and Judge Joseph Story. It is also the native city of W. H. Prescott, the historian. V.T.S.

Consult Powell's *Historic Towns of New England;* Bates' *Old Salem.*

SALEM, OHIO, the center of a rich coal-mining district in Columbiana County, in the northeastern part of the state, thirteen miles southeast of Alliance and twenty-eight miles southwest of Youngstown. It is connected with both of these cities by interurban lines, and is on the Pennsylvania Company Railroad. In 1910 the population was 8,943; in 1920 it was 10,305 (15 per cent gain). The area exceeds three square miles. Salem has a Federal building, a Carnegie Library, a fine high school building and a public hospital. The principal manufactures include steel, engines, motor boats and automobile bodies, rubber tires, pumps, nails, bath fixtures, china and gum. The place was settled in 1807, incorporated as a village in 1830 and became a city in 1887. Before the War of Secession it was a station of the Underground Railway. C.W.U.

SALEM, ORE., the capital of the state and the county seat of Marion County, situated in the northwestern section of the state, on the Willamette River, twenty-seven miles north of Albany and fifty-one miles southwest of Portland. Transportation is provided by the Southern Pacific and the Salem Falls City & Western railroads and by the Oregon Electric, and there is regular steamer connection with Portland. The place was settled by Methodist missionaries from Massachusetts in 1846, and it is supposed they named it for the city of Salem, in their home state. It was incorporated as a city in 1853, and became the state capital in 1860. Salem is the second city in the state in population, ranking next to Portland. The population increased from 14,094 in 1910 to 17,679 (Federal census) in 1920. The area is six square miles.

This attractive city, with fine, well-shaded streets, is built on ground which slopes gently from the river. Overlooking the city is the massive state capitol, whose high dome may be seen for a great distance. Among other handsome structures are the Federal building, Supreme Court building, city hall, the state institutions for the blind and the deaf mutes, the penitentiary, the reform school and the hospital for the feeble-minded. The state fair grounds are also located here. In addition to the public schools, the city has Willamette University (Methodist Episcopal), originally founded as an Indian school but opened as a university in 1844; the Academy of the Sacred Heart, the Capital Business College, Kraps Normal School, a Carnegie Library and the state library, with 103,000 volumes. At Chemawa, in the vicinity, there is an industrial training school for Indians. Salem is the trade center for the fertile Willamette Valley, a section having a large yield of fruit, hops and wheat. In 1920 there were 84 factories, capitalized at $5,637,000. The value of the products in the census year was $9,435,000. R.A.G.

SALIC, *sal'ik,* **LAW,** a term applied to a law in force in any country rendering it illegal for a woman to occupy the throne. This interpretation was based on the clause of the Barbarian Laws of the Salian or Merovingian Franks, which declared that "of Salic land no portion of the inheritance shall come to a woman." When this was drawn up, about A. D. 486, there was no reference to the throne in the law, and its first application as a pretext for keeping a woman or her heirs off the throne appears to have occurred in France during the struggle between Philip VI and Edward III of England

(1312-1377). The English king claimed the right to the crown in descent from his mother Isabella, daughter of Philip IV (the Fair), king of France. His claim was repudiated as coming from a woman, and the law preventing women or their heirs from occupying the throne became known as the Salic Law.

In 1714 Philip V introduced this law into Spain, but it was revoked by Philip VII in 1830. The question as to whether, while being barred from succession, a woman may transmit her rights to her descendants is a vexed question, which besides embroiling France and England in the fourteenth century was the cause of the War of the Austrian Succession in the eighteenth century (see SUCCESSION WARS).

SALICYLIC ACID, *sal i sil'ik as'id,* a compound of carbon, hydrogen and oxygen found in the buds of spiraea (meadowsweet), wintergreen, birch and some chemical substances. When pure it occurs in fine, white, needlelike crystals. It has a sweetish acid taste, is sparingly soluble in cold water, but dissolves readily in hot water.

Salicylic acid is a powerful antiseptic, a small quantity being sufficient to preserve most animal and vegetable substances. Until its use was forbidden by the government in 1904 it was extensively employed in preserving meat, eggs, other articles of food, and beer. Extensive investigations showed that its continuous use, even in small quantities, was injurious to the system; hence the prohibition of its use as a preservative.

Salicylic acid is employed in the arts for strengthening glue, preserving hides, and, in combination with other substances, in the manufacture of yellow, orange and purple dyes. Some of its compounds are used in medicine.

SALINA, *sa li'na,* KAN., the county seat of Saline County, is an industrial center northeast of the center of the state, 100 miles west and south of Topeka. It is served by the Atchison, Topeka & Santa Fe, the Chicago, Rock Island & Pacific, the Missouri Pacific and the Union Pacific railroads. The population, which was 9,688 in 1910, was reported to be 15,085 by the Federal census of 1920. The area is more than three square miles. Salina is the seat of Kansas Wesleyan University (Methodist Episcopal), and has Saint John's Military School, Saint John's and Saint Barnabas hospitals, a Carnegie Library, a Federal building, courthouse, city hall, Y. M. C. A. building and Oak Dale Park (forty-one acres). Salina has important wholesale interests in groceries, hardware, agricultural implements and other lines, and a good horse market; in 1920 there were 64 factories, capitalized at $5,853,000; value of products in the census year, $17,939,000.

SALISBURY, *sawlz'ber i,* ROBERT ARTHUR TALBOT GASCOYNE-CECIL, Marquis of (1830-1903), a distinguished English statesman, born at Hatfield in Hertfordshire and educated at Eton and at Christ Church, Oxford. After his graduation he traveled for a time, and in 1853 was elected to Parliament from Stamford. Before 1860 it came to be recognized that he was a decided addition to the ranks of the Conservatives, and as early as 1865 he began to be looked upon as one of the foremost politicians of England. In the latter year he became Lord Cranborne, by the death of his brother, and a year later entered the Cabinet as Secretary of State for India, but the Cabinet split in 1867 over a reform bill, and Cranborne resigned. In 1868, on the death of his father, he became third Marquis of Salisbury and took his place in the House of Lords.

Between 1869 and 1873 Salisbury was leader of the Opposition, but in 1874 he took his place as Secretary of State for India in the newly-organized Cabinet of Disraeli. He attended the conference at Constantinople in 1876, the object of which was to obtain from Turkey promises of administrative reform, but was not able to obtain Turkish consent to the British recommendations. In 1878 he became Secretary of State for Foreign Affairs, and it was largely his influence which brought about the Congress of Berlin, which he attended with his chief, Disraeli. The Conservatives went out of office in 1880, and in 1881, on the death of Beaconsfield, Salisbury became leader of the Conservative party. Not until 1885 was he again in office, but this time it was as Premier. Before anything had been accomplished the Conservatives were defeated in a general election and Gladstone became Prime Minister, but Salisbury was returned to office in 1886. Save for the years between 1892 and 1895, he remained at the head of the government until 1902.

Although during all his life he had little sympathy with the masses of the people, official confidence in him steadily increased, and was justified by his unwavering, if cautious, patriotism and by the outstanding position which he acquired among the diplomats of Europe. His great interest lay in foreign affairs, and his policy was one of peace. In 1895 a break with the United States on the Venezuelan question threatened, but Salisbury man-

aged to maintain peace in the face of difficulties. One of the chief events of his administration was the agreement with Germany in 1890 by which the British and German spheres of influence in Africa were marked out. The conduct of the South African War, during Salisbury's administration, was largely in the hands of Joseph Chamberlain, the colonial secretary. Salisbury resigned in 1902, being succeeded in the Premiership by his nephew, Arthur Balfour.

A.MC C.

Consult Aitkin's *The Marquis of Salisbury;* How's *Marquis of Salisbury.*

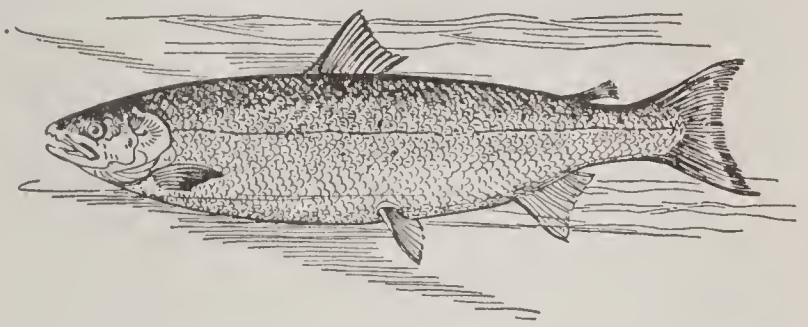
SALIVA, *sa li' va,* a watery fluid secreted by glands in the mouth, which mixes with mucus poured out by the membrane lining the mouth and helps digest the food. (For details of the work of saliva in digestion see MASTICATION; DIGESTION, subhead *The Mouth.*) Saliva serves also to keep the mouth moist, a very important factor in our physical comfort. There is scarcely anyone who has not experienced the discomfort of a dry mouth brought on by "stage fright" or shock of some sort; this is because the secretion of the fluid is temporarily stopped by nervousness.

Formerly, in the East Indies, persons accused of crime were compelled to swallow parched rice to prove their innocence. If guilty, the accused would believe that he could not swallow the rice, and his fear tended to check the action of the salivary glands and actually did prevent his swallowing the grain. The falsely accused, on the contrary, would be conscious of his innocence, and his glands would work normally. As the act of chewing tends to stimulate the secretion of saliva, some physicians advise people to chew gum for ten or fifteen minutes after a meal, for the fluid when swallowed promotes digestion in the stomach by stimulating the gastric glands. See STOMACH.

SALLUST, *sal' ust* (86-34 B.C.), a Roman historian of plebeian origin. He served as quaestor about 59 B.C., and in 52 as tribune of the people. When the Civil War broke out he took the side of Caesar, whom in 47 he accompanied on his African campaign. At its close he was appointed proconsul of Numidia, and while in this office he made himself very unpopular by his extortions. Returning to Rome with a great fortune gathered by these oppressions, he withdrew from public life and devoted his time to writing. Of his *Historiarum Libri Quinque* there remain only fragments, but the accounts of the conspiracy of Catiline and the war against Jugurtha are extant, and form the first Roman examples of what is in modern times known as history.

SALMON, *sam' un,* a large fish, living both in fresh and salt water, which belongs to the same family as the trout and the whitefish. All are immensely valuable commercially. There are nearly a hundred species of salmon, but only half a dozen of them are well known to the general public. Nearly all of them live in the ocean, but some species possess one peculiar characteristic which has long been known and never has been explained. Those that live in salt water regularly enter the fresh water of rivers to spawn, while some species that live in rivers journey to the sea to spawn. Other species that live in lakes enter running brooks at spawning time.

Because they possess traits which belong to no other fish salmon have been objects of a great deal of study. It is known that the marine salmon remains in fresh water for nearly its first two years. It then weighs but a few ounces, and following its hereditary trait it finds it way to the sea, where the next two or three years are spent. Here it grows rapidly, but probably does not travel more than twenty to forty miles from the mouth of the river in which its life began. Of its life in the sea little is known.



THE SALMON

A minor poet named Drayton thus describes the extraordinary ascent of waterfalls by this fish:

Here when the labouring fish does at the foot arrive,
And finds that by his strength but vainly he doth strive,
His tail takes in his teeth, and bending like a bow
That's to the compass drawn, aloft himself doth throw:
Then springing at his height, as doth a little wand,
That, bended end to end, and flerted from the hand,
Far off itself doth cast, so does the salmon vaut.
And if at first he fail, his second somersaut
He instantly assays: and from his nimble ring,
Still yarking never leaves, until himself he fling
Above the streamful top of the surrounded heap.

In the spring, after its fourth year, as soon as waters begin to warm, the salmon again makes its way up the river. It is now a large, strong, gamy fish, and the persistence with which it fights its way upstream in the face of

obstacles commands the admiration of observers. It advances against swift rapids, ascends small cataracts with ease and may be seen to leap almost perpendicularly upward over falls a dozen feet high. Sometimes a number of attempts to accomplish this latter feat are unsuccessful, but it persists until at last it lands in the waters above or finds the task too great for its strength. The occasional salmon defeated in its efforts to surmount a cataract dies within a few days.

The journey upstream proceeds, sometimes for hundreds of miles, at the rate of two to four miles per day, and then spawning time, October or November, has arrived. The female pours forth countless numbers of eggs, into a nest from one to four feet deep which the male has dug in the gravelly bed of the stream. After spawning, the parent pair float downstream, tails foremost. They make no effort to swim, nor to reach the sea. Within a few days—ten days, at the most—both males and females die.

Not until the following April or May do the baby salmon emerge from the eggs deposited in the nest by the parent fish. They are less than an inch in length, and for weeks each is nourished only by a yolk sac, suspended beneath the body. Gradually the sac is absorbed into the body of the little fish. When it ventures on its journey to the sea, after a period of nearly, if not quite, two years, it is but a few inches in length.

Flesh of the Salmon. People who eat canned salmon delight in the conventional orange color of the flesh, and they often assume that healthy salmon have no other color. This is not true, for at different times during a year the tint varies from creamy-white to deep orange. There is no difference in the taste of the varying shades of flesh, but it has been discovered that only the orange tints will be accepted in the markets, especially for canning. The best commercial fish are those taken in the spring, as a rule, for some species are "white-meated" in the fall. The flesh may vary in a single individual; near the head it may be dark, gradually becoming lighter towards the tail, or there may be alternate dark and light streaks running the length of the body.

Salmon Fishery. The two principal species on the Pacific coast are beyond a doubt the most valuable food fishes in the world, far exceeding the herring and the cod. These are called the quinnat, Chinook or king salmon, and the blueback, also known as the red salmon or coho. At almost all seasons they can be taken in nets; the heaviest run begins in early March, when the salmon are about to start on the long journey to the spawning grounds, and continues without much decrease until nearly spawning time. In some rivers the run is greatest in late summer and early fall. The Columbia River catch is largely the quinnat; in Puget Sound, the blueback; in Alaskan waters both species are plentiful. The total catch on the Pacific shores and in tributary rivers is worth more than $20,000,000 a year, mostly quinnats and bluebacks. Other species which are also sought are the silver, dog, and humpback salmon.

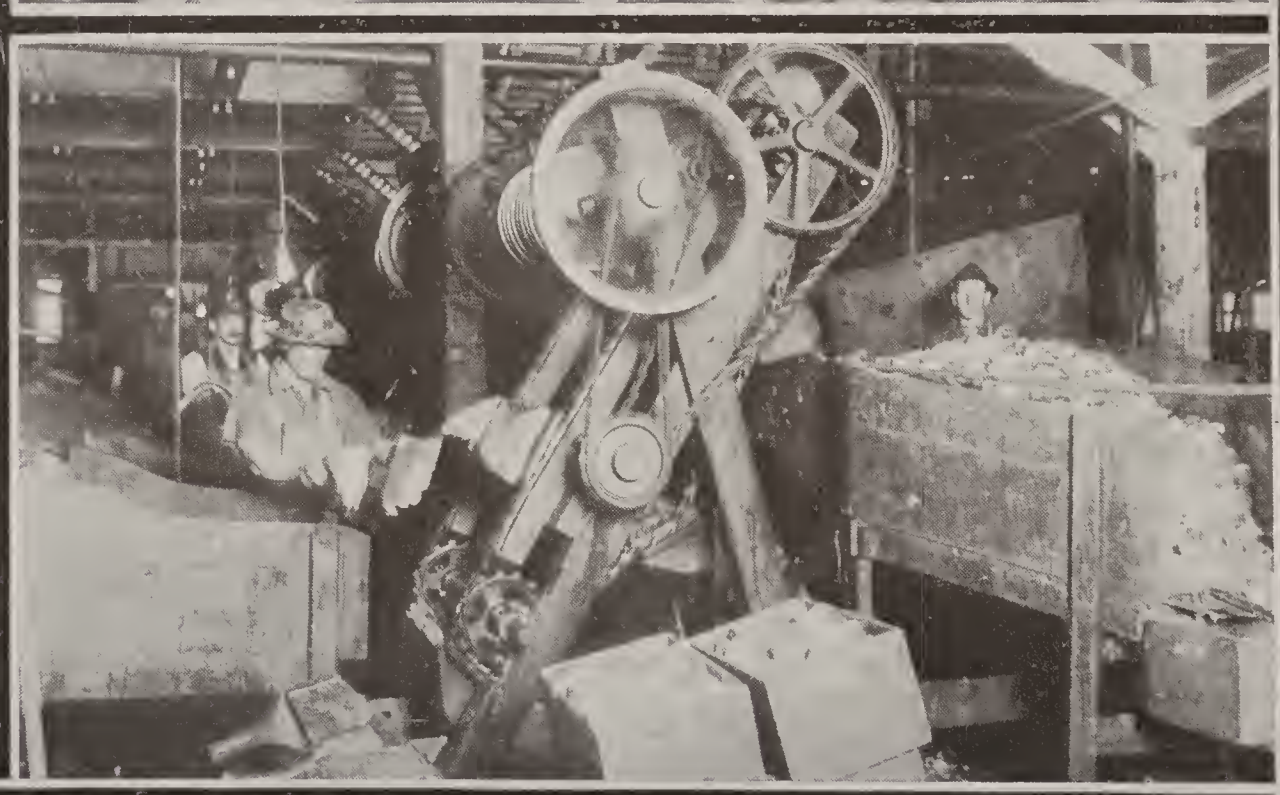
The quinnat, or Chinook, salmon, weighs, on an average, nearly twenty-five pounds, although specimens weighing nearly a hundred pounds are not rare. The bluebacks are about a third as large, their average weight being from seven to eight pounds. The silver salmon weighs from three to seven pounds; the dog salmon, about nine pounds. The quinnat's body in the spring is silvery, the back has round, black spots, and the head has a metallic luster; the bluebacks are a bright blue above and silvery below; the silver salmon is greenish above, with a few faintly-marked black spots on the back; the dog salmon is a dull silver color in the spring, but it turns to a dirty red tint in the fall.

E.D.F.

Consult Malloch's *Life History and Habits of the Salmon, Sea Trout and Other Freshwater Fish;* Jordan's *Fishes.*

SALMON TROUT, a European species of trout, which is found in salt water but ascends fresh-water streams at spawning time. It is intermediate in structure between the trout and salmon, and, like these, is of great value as a food fish. The same name is also applied to an American species of trout known more commonly as the *steelhead.* It is found quite generally in streams of the Pacific coast from the southern part of California to Alaska, and is especially abundant in the lower courses of the Columbia River. The steelhead averages from five to eight pounds in weight, though large specimens reach a weight of twenty pounds. Great numbers are caught in the Columbia and are canned or sold fresh. Because of the value of the steelhead as a food fish it is being propagated by the United States Fish Commission, and it has been introduced successfully in Lake Superior. See SALMON; TROUT.

SALOL, *sal'ohl,* or *sal'ol,* a white crystalline powder composed of salicylic acid (which see)



THE SALMON INDUSTRY.

Above: at left, securing a catch; at right, receiving room at canning factory.
Below: at left, first cleaning process; at right, cutting the fish into sections.

THE SALMON INDUSTRY.

Above: at left, another cleaning process, and machines for cutting into small pieces; at right, canning the salmon. Below: at left, cans are sealed by machinery; at right, a few million cans ready for boxing and shipment.

and phenol. It is odorless and almost tasteless. It does not dissolve in water, but dissolves readily in alcohol or ether. Salol is employed in medicine as a remedy for rheumatism, neuralgia and such intestinal diseases as cholera and jaundice. Combined with phenacetin it forms *aspirin*, which is extensively used to relieve pain.

SALON, *sa lawN'*, The Paris, a world-famous exhibition of the works of living artists, held every year at the two Palaces of the Fine Arts, in Paris, from May 1 to June 22. The exhibits consist of oil and water color paintings, sculptured figures, engravings, pastels and etchings. The prizes, consisting of medals and the coveted Prize of Rome (Prix de Rome), are awarded by a jury selected by ballot by the exhibitors, who are organized under the name Society of French Artists. The same jury decides which works are worthy of exhibition, and so all pieces entered are subjected to two tests. In 1889 there was considerable dissatisfaction over the awards, and a new society was organized (National Society of Fine Arts) which holds an independent Salon from May 15 to July 15 in the Champ de Mars (Field of Mars). It is known as the New Salon, as distinguished from the original, or Old, Salon.

SALONIKI, *sah lo ne' ke,* a Greek seaport on the Gulf of Saloniki, an arm of the Aegean Sea. It is a picturesque and ancient city, with white houses surrounded by white walls, clustering elms and cypresses and mulberry trees, broad streets paved with lava, and with the slender minarets and towers of its mosques piercing the sky line. Its harbor is ample and is protected by a great breakwater, and the city has railroad connections with all Greek cities and with the Balkan states at the north.

But the most interesting thing about Saloniki is its turbulent history. Ever since it was founded in 315 B. C., it has been the scene of successive invasions, conquests and massacres by hostile peoples from the north and the west, the south and the east, and has been, at one time or another, under the rule of practically every adjacent country and nation. In 904 it was invaded by the Saracens and 22,000 of its inhabitants were sold into slavery. In 1430, in spite of the most desperate resistance, it was taken for the fourth time by the Turks and was held by them until 1912, when it was recaptured by the Greeks.

As a neutral port and the shipping center for the entire Balkan peninsula, Saloniki entered on a period of prosperity when it fell to the Greeks, such as it had never known before. In the fall of 1915 it became necessary, however, as a part of their plan of campaign, for the allies to make a strong demonstration in Greece against the Germanic powers, which had invaded and conquered Serbia and Montenegro. Accordingly, the allies blockaded the port of Saloniki, accumulated enormous stores of food in the city, and converted it into an impregnable fortress, stationing there the army which had taken part in the campaign against the Dardanelles. In 1916, after King Constantine had refused to give moral support to the allied cause, Premier Venizelos and his forces set up a provisional government in the city. On the downfall of the king, in June, 1917, this provisional government was merged with the legal government of united Greece, and Saloniki returned to normal conditions. On August 20, of the same year, a great fire destroyed much of the business section and rendered nearly 60,000 people homeless. It was planned to rebuild at once. Population, 1920, 170,195.

SAL'SIFY. See Oyster Plant.

SALT. As a seasoner and preserver of food salt has been used from earliest times in nearly all parts of the world, and the value placed upon it is closely associated with man's advance from savage and nomadic conditions of life to those of a higher civilization.

Chemically, salt is *chloride of sodium,* that is, a compound of chlorine and sodium; in mineralogy it is known as *halite.* The sources of supply are the oceans and salt lakes, salt mines and brine springs.

Sea Salt. At one time almost all of the common salt of commerce was produced by the evaporation of sea water, and considerable quantities are still obtained in this way from San Francisco Bay, Great Salt Lake and the waters along the seaboard countries of Southern Europe. Portugal produces over 250,000 tons annually, and France between 250,000 and 300,000 tons each year. The "Salzgarten" of Austria, which are rectangular basins surrounded by sea walls, where the sea water clarifies, settles and evaporates, annually produce between 70,000 and 100,000 tons of sea salt.

Since there are about three-eighths of a pound of salt in each gallon of sea water, it has been estimated that the entire ocean if dried up would yield about 4,419,300 cubic miles of rock salt, about fourteen and one-half times the bulk of the entire continent of Europe, mountains and all. Of the larger seas, the waters of the Mediterranean and Caribbean

contain the greatest quantities of salt, but the smaller, enclosed seas, such as the Dead, Black, Red and Caspian, and Great Salt Lake, contain an even greater proportion.

Rock Salt. The greater part of the world's supply of salt is now produced from rock salt, extensive deposits of which occur in America in the Canadian province of Ontario and in the states of Michigan, New York, Ohio, Kansas,

LOUISIANA ROCK SALT MINE

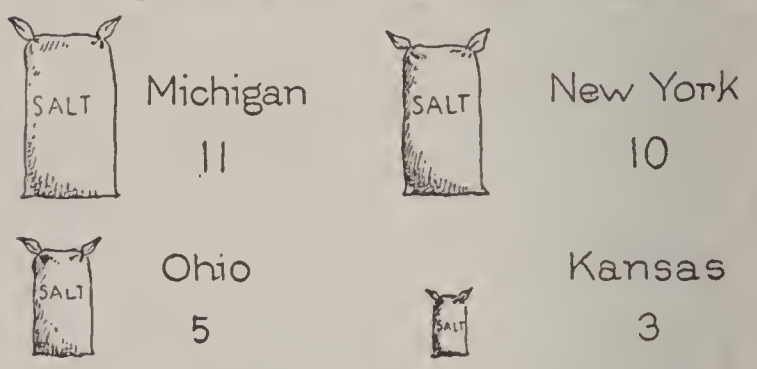
Drawn from a photograph taken 600 feet underground in a mine of solid rock salt.

California and Louisiana. Smaller quantities are found in many other states as well, in all degrees of purity, from a salty clay to pure, transparent crystals. In Nevada, extending twenty-five miles along the Virgin River, there is a saline bluff over sixty per cent of which is salt of a high grade. A deposit covering 144 acres occurs on Avery's Island, near New Iberia, La. The deep shaft mine near Detroit, Mich., produces more than any other in the country, and its supply seems inexhaustible.

The production of the United States has shown a steady increase, and tends more and more to supply the entire demand of the country, though the salt from the West Indies and Mediterranean countries is a competitor with New York salt for the trade of the Atlantic coast. The annual marketed product of the United States, including the salt of Porto Rico, now exceeds 34,000,000 barrels, or more than 4,800,000 short tons, valued at over $10,271,300. Michigan, with an annual output of more than 11,600,000 barrels, ranks first, and New York (over 10,000,000 barrels) is second. Besides consuming most of its output, the country annually imports over 900,000 barrels.

The richest fields in Europe are the Carpathian mines in Austria, where the vaulted chambers and massive pillars of salt extend thirty miles; in the lower levels of the mines there are streets and houses for the miners. Some of the largest salt mines in the world are at Wieliczka, near Cracow (which see). There are large deposits also in Western Germany, Russia, Switzerland, France, Spain and Great Britain. These salt deposits often occur where there are petroleum, bitumen and inflammable gas, and at a remarkable salt spring in China the escaping gas serves as fuel for the evaporation of the salt brine.

Rock salt is extracted by mining, by evaporating the water of natural brine springs, and by evaporating artificial brine. This latter is



PRODUCTION IN AN AVERAGE YEAR

Only those states are named which report over 3,000,000 barrels of salt in a year. (From United States Government reports.)

produced by forcing water into salt beds and dissolving the salt; the brine is then pumped to the surface and evaporated in the open air or by artificial heat.

Uses. There are various grades of salt, known as table, dairy, common, fine, packer's, solar, etc. Salt is used in the largest quantities as a seasoner of food, but it is also employed in the packing and preserving of meat and fish; in the manufacture of soda ash, sodium carbonate and caustic soda; for hardening soaps; in the glazing of coarse pottery and in improving the clearness of glass. It is a good fertilizer because it attracts and holds moisture and sets free the inert plant food in the soil. It is a necessary part of the food of cattle, and wild animals obtain it from salt licks or springs

which they often travel great distances to find.

Historical. When cereal and vegetable foods began to be used, salt became a necessity, and since it was difficult to obtain, it naturally acquired a religious significance. A salt spring was regarded by inland peoples as a special gift from the gods, and ancient Roman historians tell us that the German tribes fought for the possession of salt streams, believing that their presence gave the region a peculiar sanctity. Salt was used by the ancient Hebrews and other Semitic peoples and by the Greeks and Romans in their offerings, probably as a symbol of purity. The "covenant of salt" mentioned in the Old Testament was one which could not be broken, as salt symbolized perpetuity. Christ spoke of His disciples as "the salt of the earth" with reference to their spiritual influence on the world.

Among the Orientals of the present day, as in the past, salt used at a meal is representative of friendship and hospitality; hence the Arab phrases, "there is salt between us," signifying friendship; "to eat of a man's salt," or to partake of his hospitality; "to sit above the salt," or in the place of distinction. In Persia a man who is said to be "untrue to salt" is accused of disloyalty.

As the chief religious and economic necessities of the ancient world, salt and incense were of great importance in developing the earliest highways of commerce. The salt of Palmyra and Tadmore built up the vast trade between the Syrian ports and the Persian Gulf; the great salt mines of Northern India were the center of a wide trade before the time of Alexander the Great; a caravan route united the salt oases of the Libyan desert, and to the present day the traffic in salt forms a large part of the caravan trade of the Sahara. There was also an ancient salt trade between Aegean ports and the coasts of Southern Russia, and one of Italy's oldest roads, the *Via Salaria,* is the route by which the salt of Ostia was carried up into the Sabine country. Cakes of salt were anciently used as money in parts of Abyssinia and Tibet, and salt taxes existed even in ancient and medieval times. C.H.H.

Consult Ries's *Economic Geology;* also annual bulletins of the United States Geological Survey.

SALT LAKE CITY, Utah, the capital and the largest city of the state, the county seat of Salt Lake County, and the principal city between Denver, 741 miles southeast, and San Francisco, 920 miles southwest. The population, which was 92,777 in 1910, had increased to 118,110 (Federal census) in 1920. Nearly half of the present population is of the Mormon faith, and the city is known world-wide as the headquarters of that religious sect. The city is served by the Denver & Rio Grande, the Oregon Short Line, the San Pedro, Los Angeles & Salt Lake, the Western Pacific and the Salt Lake & Los Angeles railroads, and by several electric interurban lines. It occupies an area of forty-eight square miles.

Salt Lake is situated west of the north-central part of the state in a beautiful valley at the western base of the Wasatch Mountains, and is twelve miles southeast of Great Salt Lake. The altitude is 4,300 feet above sea level. Although pioneers found this valley almost barren, by irrigation they made it one of the most productive agricultural sections of the West. Trees, among them many Lombardy poplars, were set out by the first settlers, and the rich vegetation now seen adds much to the city's attractiveness. The streets are unusually wide (132 feet) and are regularly laid out.

Saltair Beach, about eighteen miles from the city, is a famous bathing resort on Great Salt Lake. Three miles east is Fort Douglas, a United States military reservation. Bingham, "where copper is king," is twenty-five miles southwest, and is reached by means of a scenic line of railway. Here is a mountain of copper ore, 1,600 feet high, from which 24,000 tons of ore are hauled each day.

Special Features. Near the center of the city is Temple Square, a ten-acre tract which contains the famous Mormon Temple, Tabernacle and Assembly Hall. The Temple is a massive granite structure, and in it the sacred rites and ceremonies of the Church are performed. None are admitted within the building but members of the Church. Its construction extended over a period of forty years, from 1853 to 1893, and it cost $4,000,000. The floor plan is rectangular, 186 feet long and 99 feet wide, and the structure is 107 feet high. At both ends are towers, two of them rising 157 feet each. The tabernacle is an elliptical, one-story building, whose unusual features are its great arched roof, unsupported except by the walls, and a famous pipe organ.

Among other buildings associated with the life of the Church are the Lion House, the residence of the wives of Brigham Young; Amelia House, the home of the prophet's favorite wife; the new administration building, which is a memorial to Brigham Young; and the building occupied by Zion's Coöperative Mer-

cantile Institution. The state capitol, completed in 1915 at a cost of $2,000,000, occupies a prominent position on a hill in the northern part of the city. Other noteworthy structures are the Federal building, the city and county building, the Utah and New House hotels, Salt Lake Theater, Holy Cross, Deseret and Saint Mark's hospitals, Saint Mary's Cathedral (Roman Catholic), the Union and Denver & Rio Grande depots, fine office buildings, banks, churches and schools.

Institutions and Parks. Salt Lake City is the seat of the University of Utah, which occupies a splendid site in the eastern part of the city. It has also a state normal school, All Hallow College (Roman Catholic), Gordon Academy (Congregational), the Latter Day Saints' University, Rowland Hall (Protestant Episcopal) and the Salt Lake Collegiate Institute (Presbyterian). Here also is located the state penitentiary. Among the largest parks are Liberty (100 acres), Pioneer, Majestic and Wandamere.

Industries. Salt Lake City is an important commercial city, the supply center of a vast mining, agricultural and stock-raising country. Its largest industrial establishments are smelters and mineral mills, iron works, marble works, sugar factories, canning establishments, flour mills, woolen mills and manufactories of shoes, crackers, cereals, chocolate and candy, salt, pickles and soap. The value of manufactured products averages $35,000,000 a year.

History. Under the leadership and guidance of Brigham Young, a party of Mormons arrived in the valley of the Great Salt Lake on the 24th of July, 1847. The city was organized in 1851 and was called Great Salt Lake City until 1868. The commission form of government was adopted in 1912. The water system has always been owned by the city. Salt Lake City is the birthplace of the stage favorite, Maude Adams. S.H.C.

Consult Powell's *Historic Towns of the Western States;* Fohlin's *Salt Lake City, Past and Present.*

SALTON, *sawl'ton,* **SEA,** a temporary lake formed in the southeastern part of California, chiefly in Imperial County, between the Santa Rosa and Chocolate mountains. Its basin is about 500 square miles in area and is between 200 and 300 feet below sea level, and is believed at one time to have been covered by waters from the Gulf of California, which have since receded. However this may be, this low area is now separated from the gulf by a broad, fertile ridge, at the top of which the Colorado River flows. Early in the twentieth century a company of American capitalists began extensive irrigation operations in this territory, and excavated a channel to conduct water from the Colorado to the Imperial Valley. In 1905 and in 1906 the river flooded the valley through the canal, emptying great quantities of water into the basin. It took many millions of dollars to repair damages to property and to guide the river back to its course. Scientists declare the sea will in time evaporate.

SALTPE'TER, or **NI'TER,** a compound of potassium and nitric acid, which bears a close resemblance to common salt in its outward appearance. In chemistry it is known as *potassium nitrate.* Saltpeter is found native in the earth in some localities in Spain, Egypt and India, and in caverns in Kentucky and Tennessee. Large quantities were prepared from earth in Mammoth Cave during the War of 1812. A part of the supply for use in the arts is obtained from these natural sources, but a much larger part is made by treating sodium nitrate with potassium chloride.

Saltpeter crystallizes in six-sided prisms. It dissolves readily in water, to which it imparts a salty taste. It is a mild antiseptic, and small quantities are sometimes put into brine employed in preserving meat. Its most extensive use in the arts is in the manufacture of gunpowder (which see). It is also employed in the manufacture of fireworks and matches. It is valuable as a flux in smelting certain ores, and is employed so some extent in dyeing.

Chile Saltpeter is a nitrate of sodium which obtains its name from the fact that extensive beds of it are found in Northern Chile and Bolivia. It is also called *soda saltpeter.* It is extensively employed in the manufacture of saltpeter and as a fertilizer. Antofagasta is the port from which most of it is shipped.

SALTS, a name given to saline laxatives generally. The more important are *Epsom salts,* or magnesium sulphate, *Glauber's salt,* or sodium sulphate, and *Rochelle salts,* or sodium and potassium tartrate. They produce copious bowel movements and have the common property of drawing off water from the blood. In cases of emergency and in the treatment of certain diseases these salts are prescribed by physicians, but best authority advises against indiscriminate use of any saline laxative. C.B.B.

Related Subjects. For further information on this subject the reader is referred to the following articles in these volumes:

Epsom Salts
Glauber's Salt

Medicine and Drugs
Seidlitz Powders

SALVADOR, *sahl va dohr',* a wildly picturesque, tropical country, the smallest but most progressive and most densely-populated of Central American republics. With an area of 7,225 square miles, Salvador is one-fifth the size of the state of Indiana, but its population of 1,501,000 in 1922 was almost half that of the state named, and averaged about 170 to the square mile. Salvador received its name from the Spanish adventurer, Pedro de Alvarado, who conquered it in 1524. For colored map, see North America.

LOCATION MAP

Climate, Land and Products. Along the coast of the republic there is a low plain about fifteen miles wide. This region is known as the *hot lands,* and is a place subject to fevers. The vegetation there is richly tropical, and balsam from the Balsam Coast, at the west, is an important article of export.

The interior of the country is rugged—a plateau about 2,000 feet above sea level, broken by mountains and volcanic cones, some reaching heights of from 6,000 to 8,000 feet. Izalco is the most noted of the volcanoes, and it has been active almost continuously for more than a hundred years. The south-central region around the capital, San Salvador, is especially subject to earthquakes, and that city has been destroyed eleven times by such disturbances since the middle of the sixteenth century. On the table-lands and mountain slopes, however, 12° north of the equator, the climate is temperate, even and healthful. From May to October is the wet season, called winter. From November to April is the dry season or summer. The rainfall is abundant for agricultural purposes, and most of the land is under cultivation, though primitive methods are still largely employed. The principal crop is coffee, and about $6,500,000 worth is exported yearly. Other important crops are cacao, rubber, tobacco and sugar. Cotton growing is encouraged by the government through granting bounties on exports. Attempts are being made at wheat cultivation, and tree planting is encouraged.

The most fertile and most populous region of Salvador is the magnificent valley of the Lempa, the chief river of the republic. This river is the largest on the Pacific coast of Central America, and is navigable by small steamers for 100 miles of its 200-mile course. Most of the lakes are of volcanic origin. The principal ones are Guija, which belongs partly to Guatemala, and Ilopango, in south-central Salvador.

Gold, silver, copper, iron and quicksilver are found, and mining industries are increasing in importance. Flour, indigo, sugar, balsam and rum are manufactured, but there is opportunity for much development. Considering the natural resources, manufacturing industries should in time be very profitable.

Transportation and Commerce. There are about 2,000 miles of good road in Salvador, and in 1922 there were over 210 miles of narrow-gauge railway. These railways connect the chief ports, Acajutla, La Libertad and La Union, with the chief cities, Santa Ana, San Salvador and San Miguel. La Union, at the southeast, is considered the best harbor in Central America. Trade is chiefly with the United States, Germany and France. Yearly exports in 1921 were valued at over $20,000,000 and imports at almost $14,000,000. The opening of the Panama Canal will in all probability materially increase these yearly figures.

People and Government. Over 770,000 of the inhabitants of Salvador are of mixed white and Indian blood, and are called Ladinos, or Mestizos. One-third that number are of pure Indian blood. So over 1,000,000, or the bulk of the population, are Ladinos and pure Indians, only about 250,000 of the people being foreigners. Yet the economic development and stability of the republic are markedly in advance of those of its larger neighbors, with populations very similarly proportioned.

Education is free and compulsory. In 1921 there were over 850 primary schools with an enrolment of over 50,000. There were also twenty-seven higher schools and a national university. Most of the people are Roman Catholics, and Roman Catholicism is the state religion, but other creeds are tolerated. Spanish is the official language.

Under a Constitution adopted in 1824 and frequently modified since that time, executive power is in the hands of a President, elected for four years. Legislative power is in a Congress of forty-two Deputies, elected for one year by universal suffrage. The governors of

the fourteen departments, or states, are appointed by the President.

History. After 1524 the country was a possession of Spain until 1821, when it revolted and joined the Mexican Confederation. Two years later it withdrew from that union, and later formed part of the republic of Central America. In 1853 it became independent. Like all South and Central American states, its progress has been greatly retarded by wars and revolutions. H.M.S.

Consult Martin's *Salvador of the Twentieth Century.*

Related Subjects. The reader is referred to the following articles in these volumes:

Alvarado, Pedro de	Coffee
Central America	San Salvador

SALVAGE, *sal'vaj,* a term denoting the service rendered in preserving life and in saving property from damage or loss, or the reward for such service. Originally salvage was restricted to the losses at sea, and awards were adjusted by the admiralty courts. In the United States salvage is awarded for ships, goods and life saved on lakes and navigable rivers on which interstate commerce is carried. *Military salvage* refers to rescuing property in time of war and usually pertains to ships and their cargoes. In large cities insurance companies maintain paid salvage corps to save property from loss by fire. The award for salvage is determined by the risk run and the value of the property saved. In all cases it is more than mere pay for time and labor expended, the excess being considered a reward for the effort made and also an inducement to others to engage in like work.

SALVA'TION ARMY, a religious body with semimilitary organization, whose purpose is to bring spiritual and material benefit to those whom the conservative religious bodies do not reach. Its founder, "General" William Booth, who was originally a Methodist minister, finding the Church unsympathetic toward his work for the unfortunate, began holding independent meetings for the poor, in 1864, in an unused graveyard in London. The organization which resulted was at first known as the Christian Mission; it did not receive its military name and system till 1878. The Army was remarkably successful in the East End of London, from which it spread throughout the United Kingdom and then to all English-speaking countries. It was introduced into the United States in 1880, where, however, disagreements caused the organization of a new society (see Volunteers of America). Now its activities are carried on in Europe, Asia, Africa, North and South America and Australia.

The beliefs of the Salvation Army are those of evangelical Christianity. Piety and ability are the only qualifications required of the officers. Men and women have equal rights and both are dressed in uniform. It is the custom of the members to hold meetings in the open air, gathering a crowd by means of musical instruments and singing, and later inviting the people to a hall for further services. As many of their hearers are of the destitute classes, much relief work is necessary. A feature of their work is the Christmas dinner given every year to the needy poor. The Salvation Army maintains numerous orphanages and industrial and rescue homes, but these institutions serve more as clearing houses for the unfortunate than as places of permanent residences. There is also a training school for American workers, located in New York. The Army activities are supported by voluntary contributions, and the official publication is the *War Cry.*

In the War of the Nations the Salvation Army won imperishable laurels. Its representatives were sent in large numbers to the zones of fighting, and neither hardship nor danger deterred them in the task of relieving the distress of the "doughboys." The Salvation "lassies" even penetrated to the first line trenches to carry food to the soldiers.

SALVINI, *sahl ve'ne,* Tommaso (1829-1916), an actor, born at Milan, Italy. His parents were players, and they trained him in childhood for the same profession. He began to act during his fourteenth year, and at eighteen had risen to such prominence that he was chosen by Ristori to play leading rôles in her company. In 1847 he caused a sensation among Italian theatergoers in Rome by his vigorous acting in Alfiero's famous tragedy, *Oreste.* He left the stage in 1849 to fight in the Italian war for independence, but by 1851 was again playing with success. In 1868 he organized his own company, toured Europe repeatedly, and made five trips to America between 1873 and 1889. Everywhere audiences were astonished by his spirited and sometimes violent acting of tragic parts.

He had original views as to the nature of many characters in drama, such as Hamlet and Othello, whom he impersonated as vicious and unprincipled men. This attitude led to harsh criticism both in America and England, but the powerful effect of his work was never disputed.

He practically retired from the stage in 1890, but during the next twelve years appeared now and then in Rome, and audiences marveled at the vigor he retained in his extreme age. His book, *Records, Anecdotes and Impressions,* published at Milan in 1895, is considered of value to students of the European theater.

SAMARIA, *sa ma'ri a,* the capital of the northern kingdom of Israel during the reigns of the later kings. It was built by Omri, in the ninth century B. C., and named for the original owner of the site, Shemer (*I Kings* XVI, 24). Samaria was captured by the Assyrians about 722 B. C., and the region was repopulated with immigrants from the east, who were thereafter known as Samaritans (see below). After a long and troubled history the town was given by the Emperor Augustus to Herod the Great, who named it Sebaste and rebuilt it on a magnificent scale. It survives at the present day in the small village of Sebastiyeh.

Samaritans, *sa ma'ri tanz,* originally Babylonian and Assyrian colonists brought by the king of Assyria to take the places of the deported Jews after the fall of the northern kingdom (*II Kings* XVII, 24). A Jewish priest was sent to teach them "the manner of the God of the land," and they gradually dropped their heathen observances and adopted the religion of the Pentateuch. After their return from the exile, the Jews scorned the proposal of the Samaritans that they be permitted to assist in the rebuilding of the Temple. Later the Samaritans built a temple of their own, on Mount Gerizim. This was destroyed by John Hyrcanus (about 120 B. C.).

RUINS OF SAMARIA

These walls have stood since the early years of the Christian Era.

At the time of Christ, though the Samaritans dwelt in the very center of Palestine, the Jews "had no dealings" with them, because they regarded them as heretics. Jesus went through their land and held his memorable conversation with the Samaritan woman at the well of Jacob (*John* IV, 1-26), and Philip preached the gospel later to the Samaritans. On the overthrow of Palestine by the Romans, the Samaritans shared the fate of the Jews and were scattered abroad among different nations. A very small colony of them still persists, in Nabius, near the ancient Samaria.

Consult Montgomery's *The Samaritans, the Earliest Jewish Sect;* Cheyne's *Jewish Religious Life after the Exile.*

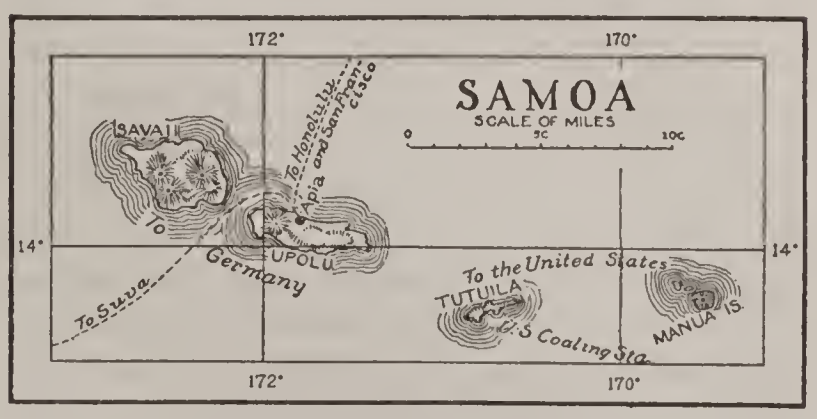
SAMARKAND, *sam ar kant',* capital of the territory of the same name, is a famous city of Russian Turkestan. It is situated about 140 miles east of Bokhara, on the Transcaspian Railway (see colored map, Asia, opposite page 417). The city occupies the site of ancient Marakanda, which Alexander the Great destroyed in 329 B. C. during his invasion of Central Asia. In the fourteenth century Samarkand became the residence of the great Mongol conqueror Timur, or Tamerlane, and he made it one of the most magnificent cities in Asia.

The original city, which is still partly enclosed by the old wall, contains several famous mosque schools and a beautiful mausoleum with a dome of blue tiles, within which are the tombs of Timur and his family. Outside of the wall is one of the most splendid mosques in Central Asia—that of Shah-Zindeh—famed for its interior decorations. The Russian and newer portion of Samarkand, which lies beyond the ancient citadel, is regularly built and has the general aspect of a modern Asiatic city. There is considerable trade in cotton, rice, silk, gold and silver wares, pottery and wines. Population, about 90,000.

SAM'NITES, an Italian people of Sabine origin, who lived in the mountainous region of Southern Italy in ancient times. They were divided into four nations: the Caraceni in the north; the Pentri in the center; the Caudini in the Southwest; and the Hirpini in the south. After four terrible conflicts with the Romans the Samnites were almost exterminated. See Rome, subhead *History.*

SAMOA, *sah mo'ah,* or **SAMOAN ISLANDS,** formerly called NAVIGATOR ISLANDS, is an archipelago of fourteen islands in the South Pacific Ocean, 4,200 miles southwest of San Francisco and 2,400 miles northeast of Sydney, Australia (see colored map, with the article OCEANIA). They have a combined area of about 1,100 square miles. At the outbreak of the War of the Nations in 1914 the Samoan archipelago was owned partly by Germany and partly by the United States. On August 29, 1914, a British force from New Zealand occupied Apia, a port of the German island of Upolu, and eventually all of German Samoa was brought under the administration of New Zealand.

Tutuila and all other Samoan islands east of the 171st meridian, west longitude, came into the possession of the United States in 1900, according to a treaty negotiated by the United States, Germany and Great Britain. Tutuila has an area of about seventy-seven square miles and a population of about 7,250; it is the most attractive island of the group, and has the only good harbor in Samoa, that of Pagopago. The United States maintains a naval station on Tutuila, the commandant of which is also the governor of the island. The most important of the other American islands, known as the Manua group, have a combined area of twenty-five square miles and a population of about 1,800. Germany, by the treaty mentioned above, acquired all islands west of the 171st meridian. The most important of this group are Savaii, 660 square miles in area, and Upolu, 340 square miles. These are the two largest

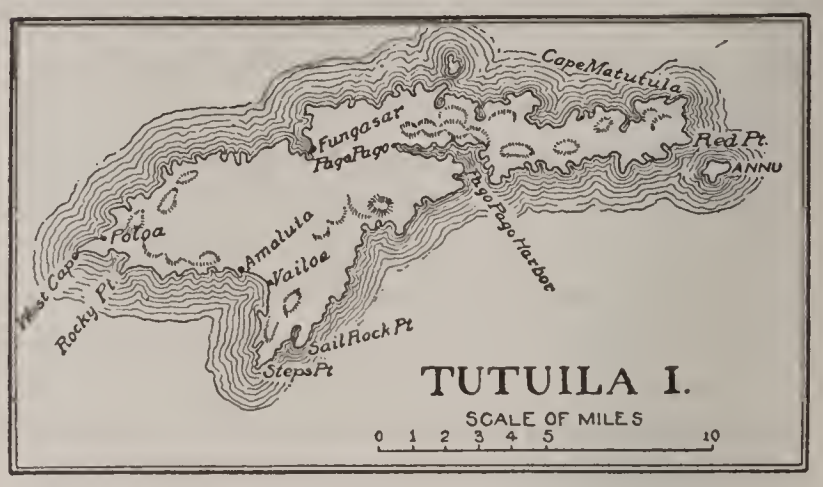


THE SAMOAN ISLANDS

The western islands are yet credited to Germany, for their fate after the War of the Nations is in doubt.

islands in Samoa. Upolu was for years the home of Robert Louis Stevenson, and his grave is on beautiful Mount Vaea, overlooking Apia.

Most of the islands are very beautiful, with picturesque mountains, luxuriant forests, fertile valleys and flat lands sloping towards the sea. The climate is pleasant on the whole, although fierce hurricanes occur from January to March. In 1889 two American and two German warships were beaten to pieces on the beach at Apia in a memorable storm which Stevenson describes in *A Footnote to History.* The forests are remarkable for the size and variety of



ISLAND OF TUTUILA

The central island of the group, belonging to the United States.

their trees, and the luxuriance and beauty of the creepers, tree ferns and parasites. There are sixteen varieties of the cocoanut palm and twenty varieties of breadfruit tree, which provide the natives with their principal food. Copra, the dried meat of the cocoanut, is exported. There are no animals except a native rat, four species of snakes and a few birds. The native Samoans, who number about 39,000, are the best type of Polynesians—tall, well built, brown-skinned and good looking. They are simple, honorable, generous and hospitable, and are brave fighters and famous sailors and boat-builders. A.C.

Consult La Farge's *Reminiscences of the South Seas.*

SAMOS, *sa'mahs,* an island belonging to Turkey, situated in the Grecian Archipelago and separated from the coast of Asia Minor by the strait Little Boghaz. It covers an area of 289 square miles, and the population, consisting almost entirely of Greeks, is 65,000. The capital is Vathy, situated near the site of ancient Samos, a magnificent city in the times of ancient Grecian power.

Olives, grapes and other fruits are cultivated; oil, wine, silk, cotton and figs are exported. The island contains considerable mineral wealth, marble, silver, iron, lead and emery being found, but not extensively worked. The island is administered by a governor styled the *Prince of Samos,* who pays annual tribute to the sultan of Turkey.

SAMP'SON, WILLIAM THOMAS (1840-1902), an American naval officer, who planned the blockade of Santiago harbor in the Spanish American War, was born in Palmyra, N. Y.,

the son of Irish immigrants. William went to the public schools and studied at home, in 1857 was appointed midshipman in the United States Naval Academy, and was graduated in 1861, just at the beginning of the War of Secession. The next year, following service on the *Potomac,* he was advanced to the rank of second lieutenant. Later, as executive officer on the *Patapsco,* he was ordered to clear the Charleston harbor of mines and torpedoes, and succeeded in entering the harbor, but his ship was blown up, and Sampson was rescued 150 feet from the wreck. He was then made lieutenant-commander, and in 1866 served on the *Colorado,* the flagship of the European squadron. From 1868 to 1871 he was an instructor in the Naval Academy.

REAR-ADMIRAL SAMPSON

Because he was not present during most of the Battle of Santiago and the successful encounter was directed by Commodore Schley, the partisans of each engaged in a bitter controversy over the question of honors for the victory.

Sampson held many positions of trust, among others those of assistant superintendent of the United States naval observatory, superintendent of the Naval Academy, delegate to the international maritime conference, presiding officer on the board of inquiry into the sinking of the *Maine,* and member of the commission to arrange for the evacuation of Cuba.

In 1889 he was made captain on the first modern steel cruiser, and in 1897 was commander of the battleship *Iowa.* At the outbreak of the Spanish-American War in 1898 he was given charge of the North Atlantic squadron, and was commander-in-chief of the United States naval forces off the coast of Cuba. Sampson was in charge of the blockade of Santiago Harbor, but while he was at Siboney conferring with General Shafter, who commanded the land forces, the Spanish fleet attempted to escape, and Sampson only reached Santiago in time to witness the last of the battle, which in his absence had been directed by Winfield Scott Schley. In 1899 he was advanced to the rank of rear-admiral. He took command of the Charleston navy yards, but withdrew from active service when he reached his sixty-second year, the age of retirement. Sampson died in Washington, D. C., May 6, 1902. He was considered one of the highest authorities on ordnance.

Related Subjects. The reader is referred to the following articles in these volumes:

Santiago, Battle of
Schley, Winfield Scott
Shafter, William Rufus
Spanish-American War

SAM'SON, a popular hero and judge of the ancient Hebrews, famed for remarkable strength. The story of his life is told in the Bible in chapters fourteen to sixteen of the book of *Judges.*

Before his birth, Samson's mother was commanded by an angel to bring up the child as a Nazarite, which meant that he must never drink wine, eat "unclean things" or cut his hair. When Samson fell in love with a Philistine woman and she proved faithless, he took revenge by setting fire to the fields and vineyards of her people. The Philistines retaliated by forcing Samson's countrymen to surrender him into their power. Then "the Spirit of the Lord came upon him;" he broke his bonds, and with the jawbone of an ass killed a thousand of his enemies. Later they conspired to recapture this dreaded foe by locking the city gates of Gaza to prevent his escape, but he tore out doors, posts and all, and carried them to a hilltop forty miles away.

Samson's downfall finally came about through a Philistine woman named Delilah. Coaxing from him the secret that his strength lay in his unshorn locks, she treacherously cut them off while he slept. He was imprisoned and blinded. When the great festival of their god Dagon arrived, the Philistines gathered by thousands in the temple to gloat over Samson's defeat. But during his captivity his hair had again grown long, bringing back his former might, and, with a prayer for power, he pulled down the two great pillars which supported the roof. The temple collapsed, and thus "the dead which he slew at his death were more than they which he slew in his life." According to Biblical history, all this happened in 1113 B. C.

The life of Samson forms the basis of Milton's drama, *Samson Agonistes,* and also of the opera *Samson and Delilah,* by Saint-Saëns. Many students find in the story traces of ancient sun myths, and some compare his exploits to the famous Twelve Labors of Hercules in Greek mythology; in fact, Samson is often called "the Jewish Hercules." L.M.B.

Consult Carus's *The Story of Samson and Its Place in the Religious Development of Mankind.*

SAMUEL, *sam'u el,* the earliest of the Hebrew prophets after Moses, and the last of the judges of Israel, who freed his country from foreign oppression and idolatry. Although born in Ramah, he was taken to the tabernacle at Shiloh while still a young child, by his mother, Hannah, who had promised that he should be consecrated to the service of God. There the boy grew to manhood under the guidance of the high priest, Eli. When Samuel was twelve years old God revealed to him the approaching doom of Eli's house, and by the time the boy had grown to manhood all Israel knew that he was to be a prophet of the Lord. Twenty years after Eli died Samuel led his people to Mizpah, where they prayed and fasted until the Philistines suddenly attacked them. By the aid of God the Israelites gained such a victory over their enemy that they never dared to invade the land again while Samuel was at the head of affairs. From that time on the people, who had been gradually reforming under their leader's guidance, faithfully worshiped God.

When Samuel was old he made his two sons judges at Beersheba, but they proved unworthy of their trust, so, upon the request of the Israelite elders and people, he anointed Saul as king. Later on God was displeased with the actions of Saul and told Samuel to anoint David as ruler. Soon after this the old man died, while David was still a fugitive from Saul, and was buried in Ramah, all Israel lamenting his loss. According to Hebrew chronology he lived from 1165 to 1060 B. C., but recent authorities differ greatly in their opinions concerning these dates.

The Books of Samuel, which were originally one book written by some unknown author, relate not only the life of Samuel but also describe the reigns of Saul and David, the two kings whom he anointed. They form two books of the Old Testament at the end of the period of judges, and were probably written by some prophet before the fall of Jerusalem. E.C.

Consult Meyer's *Samuel the Prophet;* Douglas's *Samuel and His Age.*

SAMURAI, *sah'moo ri,* the military class during the feudal period in Japan. Originally applied only to the military guards of the Mikado's palace, the term later was used to describe the whole military system of the country. The samurai class included the *shogun,* or commander-in-chief, the *daimios,* or feudal nobles, holding land in exchange for military services, and their retainers, including the privileged "two sword" men, the great fighters of the country.

The feudal system was abolished in 1871, the *daimios* gave back to the emperor the lands they held and received pensions for themselves and their retainers. The wearing of swords was prohibited, and the *samurai* and *daimios* became the "nobility" and "gentry" of Japan. In 1912 General Nogi, a famous Japanese of the *samurai* class, followed an old *samurai* custom by committing suicide, along with his wife, as a token of grief at the death of Emperor Mutsuhito. One of the privileges of the *samurai* was that of committing suicide by harakiri rather than live to face dishonor.

SAN ANGELO, *an'jeh lo,* TEX., the county seat of Tom Green County, situated southwest of the center of the state, 239 miles southwest of Fort Worth and 449 miles east of El Paso. It is at the junction of the North, Middle and South Concho rivers and on the Gulf, Colorado & Santa Fe and the Kansas City, Mexico & Orient railroads. Stock raising is the chief industry of the surrounding country. The city is a wholesale distributing center, and has an iron foundry, machine shops, a cottonseed-oil mill, grain elevator and creamery. Prominent features are a Federal building erected in 1911 at a cost of $130,000, and Saint John's Hospital (Roman Catholic). The city adopted the commission form of government in 1915. In 1910 the population was 10,321. The area exceeds four square miles. T.F.O.

SAN ANTO'NIO, TEX., the oldest, the largest in 1910, and the most romantic city in the state. It is built partly of modern steel and concrete, and partly of adobe houses built in an early day by Mexican settlers, with a background of sunny skies, semitropical foliage and historic relics. San Antonio is situated about midway between the geographical center of the state and its southernmost extremity, in Bexar County, of which it is the county seat, and is on the San Antonio River. Austin, the state capital, is eighty miles northeast, Houston is 280 miles southeast, and Laredo is 150 miles southwest. Railway transportation is provided by the Southern Pacific, the International & Great Northern, the Missouri, Kansas & Texas, the San Antonio & Aransas Pass, the Gulf Shore and the San Antonio, Uvalde & Gulf lines. Mexicans comprise about twenty per cent of the population, which in 1920 was 161,308 (Federal census); the census of 1910 reported 96,614. The area is a little less than thirty-six square miles.

Description. San Antonio is unlike any other city in America. It is spoken of as "the city of a thousand charms," for it possesses a delightful, healthful climate, beautiful residences, parks and plazas, fine roads, facilities for bathing and boating and an abundance of artesian and mineral waters; to these are added all the attractions that an army post can bring into the social life of a community. Seventeen iron bridges span the river, which winds gracefully through the city and through Brackenridge Park (250 acres), a popular feature of which is the Lambert Bathing Beach. The park is a woodland and contains an interesting zoölogical garden; it is the largest of the city's park reservations. San Pedro Park, with famous springs, is the site of the original Indian settlement of San Antonio. Besides these, the city has a number of smaller parks and green spots called plazas. San Antonio has several attractive suburbs, including West End, Alamo Heights and Hot Sulphur Wells; the last named has medicinal baths. Fort Sam Houston, on the outskirts of the city, is one of the largest army posts in the Union; it covers almost 1,000 acres, and represents an investment of nearly $5,000,000.

Buildings. The Alamo, the most famous structure, is held in reverence by all Texans for the part it played in the Texan Revolution (for illustration and description, see ALAMO). Other buildings of historical interest are the

THE SAN JOSÉ MISSION

The most famous of the old Spanish mission buildings still standing in or near San Antonio. Nearly all of them were built between 1720 and 1750.

San Fernando Cathedral and the ruins of four old Franciscan missions. San Antonio has a magnificent city hall in the center of a plaza, a massive courthouse, a Federal building, and a convention hall which is also a market house. There are more than fifty churches, the most striking of these being the two cathedrals. Although the city has no universities or colleges, it is an educational center of importance in the Southwest, having fourteen preparatory schools, forty-five private schools, thirty-four public schools (three for negroes) and a Carnegie Library. San Antonio has long been a resort for health seekers, because of its climate and mineral water. There are four public hospitals, and a number of fine hotels, notably the Gunter and Saint Anthony.

Commerce and Industry. The city is the distributing point for a territory as large as the state of Ohio, and is the retail center for Southwest Texas and a large portion of Mexico. It is located near a great live-stock country, and in the mountainous district to the northwest the raising of Angora goats is an important industry; the greater supply of mohair used in the United States comes from this section. The territory around San Antonio is also rich agriculturally, all kinds of fruit, vegetables and forage crops and great quantities of cotton and pecans being grown. The leading industrial plants of the city are breweries, cotton presses, broom factories, oil mills and refineries, packing houses and cement works. There are about 470 factories, their annual output being estimated at over $36,600,000; the deposits of oil and natural gas in the vicinity, combined with fine shipping facilities, offer inducements to further increase in manufacture.

History. The present site of San Antonio was occupied by settlers from Monterey in 1715, but the permanent settlement was made in 1718 by Spaniards, some families from the Canary Islands settling at that time on what is now known as the Main Plaza. The place (San Antonio de Bexar) was named in honor of Saint Anthony (San Antonio) and the Duke de Bexar. It was an important military station, and the capital of Texas while it was a Spanish and Mexican province. During the war between Mexico and Spain it was the scene of fierce fighting and cruel bloodshed. In the war for Texan independence eight battles were fought in and near San Antonio. Here, in 1836, occurred one of the most memorable and most tragic conflicts in American history, when 179 brave Texans, including such famous frontiersmen as Davy Crockett, James Bowie and William Travis, were massacred by the Mexicans under Santa Anna, while defending the church of the Alamo, which had been converted into a fort.

In 1840 there was more fierce fighting with the Indians; in 1842 the city was again taken by the Mexicans, and after another desperate bat-

tle was retaken by the Texans. San Antonio has been a military station for troops since the close of the Mexican difficulties, save during the War of Secession. An arsenal for the manufacture and storage of ammunition is also located here. In 1878 the first railroad was built to the city and since that time its growth has been remarkable. In 1913 the commission form of government was adopted, providing for a mayor and three commissioners. J.B.C.

SAN BERNARDINO, *ber nahr de'no,* CAL., the county seat of San Bernardino County, situated in the southwestern part of the state, sixty miles east of Los Angeles and 125 miles northeast of San Diego. It is on the Southern Pacific, the Atchison, Topeka & Santa Fe and the San Pedro, Los Angeles & Salt Lake railroads, and has electric interurban service. In 1910 the population was 12,779; in 1920 it was 18,721 (47 per cent gain). The area of the city is nearly seven square miles.

San Bernardino is situated in a beautiful valley of the San Bernardino Mountains, and its abundant, semitropical vegetation is delightfully green and refreshing in contrast with the stunted growths of the great Colorado Desert, which reaches nearly to the city. It is in the California orange belt; in the surrounding region are also grown plentiful crops of lemons, grapes, apples, hay and alfalfa. The city has an important wholesale trade, mining and stock-raising interests, and foundries and machine shops, the railroad shops of the Santa Fe, which employ from 1,200 to 1,500 men, box factories, artificial stoneworks, and an extensive pre-cooling plant.

The city contains a fine courthouse, a Carnegie Library, Y. M. C. A. building and a $275,000 polytechnic high school. There are two attractive parks, and directly east, in the San Bernardino National Forest, are many lake resorts. San Bernardino was founded by Mormons in 1851, on the site of an earlier mission of that name, and became a city in 1860.

SAND consists of fine particles of quartz and feldspar, mixed loosely in a mass. When sand is cemented together by some other mineral it forms sandstone. Most sand has been formed by the wearing away of rock, and it is still being formed wherever the waves of the sea or any other large body of water are coming in contact with sand-bearing rock. Many miles of ocean beaches are covered with sand, and in some localities, such as Dune Park in Indiana and along the eastern shore of Lake Michigan, there are series of sand hills which look like small mountains. Some sands contain the ores, iron, gold, and platinum, and other metals are occasionally obtained from sand in paying quantities. Sand is used in the manufacture of glass, in making mortar for bricklaying and for filters.

Related Subjects. For information that will be of interest in this connection, the reader may consult the following articles in these volumes:

Dune	Quartz
Feldspar	Sandstone
Glass	Soil

SAND, GEORGE (1804-1876), a French novelist, whose real name was ARMANTINE LUCILE AURORE DUPIN DUDEVANT, was born at Paris. Her father was a French officer and her early childhood was spent among the rough soldiers of his regiment. Strictly speaking, she received no education. Between her eighth and fourteenth years she lived in the country near Nohant, France, and learned a little of literature, Latin and Italian. In 1822 she married a country squire, M. Dudevant, and lived an uncomfortable life for nine years, but separated from him in 1831, partly because of his habits, but far more because of the wide difference in their tastes and intellectual abilities. She gave him practically her entire fortune and received in return a yearly allowance of six hundred dollars, gladly choosing freedom at such a sacrifice; then she went to Paris, where she began to write for the *Figaro.* There she met Jules Sandeau, lived with him some years, and they collaborated in the writing of her early books. The couple used the pen name Jules Sand, but when she wrote her first novel, *Indiana,* independently, she changed the pen name to GEORGE SAND.

Indiana caused much excitement and numerous literary and legal discussions because of its arguments against the continuance of marriage vows after affection is dead. George Sand fully lived up to her doctrines of freedom, and passed with surprising quickness from one lover to another. In spite of her many courtships she found time to write methodically and rapidly, with the result that of all women authors she was the most prolific.

Her work may be divided into five periods. Previous to 1836 she wrote such novels as *Lelia, Jacques, Andre* and *Metelle,* dealing with misplaced love and with herself idealized as the heroine. Then, in the second period, from 1836 to 1840, she became interested in socialism and produced such stories of ideal government as *Mauprat, The Seven Strings of the Lyre* and

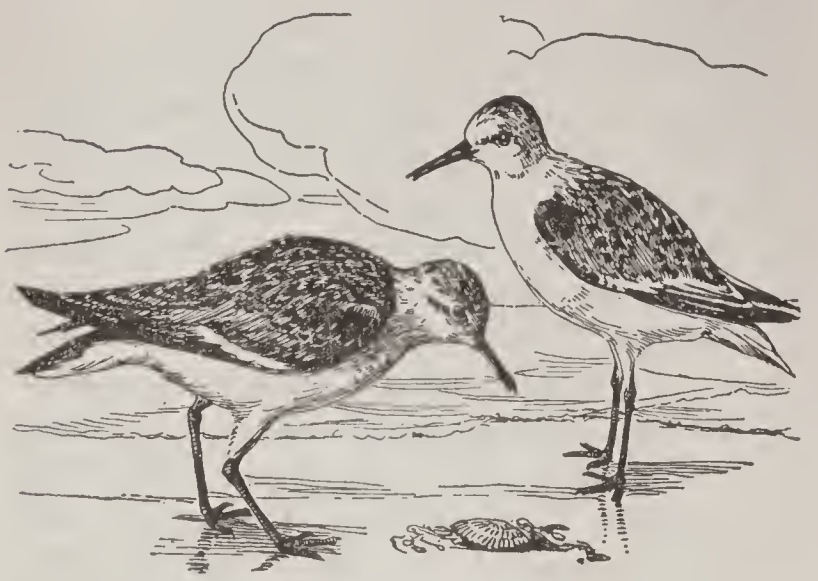
Gabriel. The third period, extending to 1847, deals, in *Consuelo* and *The Sin of M. Antoine,* with rather uninteresting political speculations. In the fourth period she returned to her love of nature and wrote exquisite descriptions of rural life in *Little Fadette* and *The Snow Man.* During the last years of her life she dealt once more with analysis of character and emotions in such novels as *The Marquis of Villemer* and *Flamaraude.* She had an extraordinary sympathy for her fellow beings, an almost unsurpassed ability in portraying the progress of love and the artist's genius for creating glowing descriptions.

Consult Doumic's *George Sand: Some Aspects of Her Life and Work* (translation by Hallard).

SAN'DALWOOD, a costly, fragrant wood yielded by several species of trees growing in the East Indies and other tropical islands. The variety most generally seen is white sandalwood, but yellow and red sandalwoods are also marketed. Sandalwood is used in making cabinets and chests and small objects of an ornamental nature, such as fans and fancy boxes. Incense sticks are also made from it. Because of the heavy fragrance of the wood insects will keep away from clothing stored in sandalwood chests. Sandalwood oil, obtained by distillation, is used in perfumes and medicinally. The heartwood of red sandalwood yields a coloring matter used in dyeing wool; it is also the basis of certain tooth powders.

SAND BUR, or **BUR GRASS,** an annoying prickly weed, native to the plains of the Western United States, and found growing in sandy regions in almost all temperate and tropical countries. The plant has stems from one to two feet long, bearing spikes of ten to twenty spiny burs which cause painful wounds when they enter the flesh. Sometimes the burs become so matted and entangled in the wool of a sheep that the whole fleece is useless for commercial purposes. A species common to the South is called the *cockspur,* and is no less troublesome than the sand bur.

SAND'ERLING, a bird belonging to the same family as the snipes and sandpipers, but distinguished from these birds in having three toes. It is a true beach bird, and is usually found on shores washed by the sea; its food consists of small shellfish and marine insects washed up by the tide. In America the sanderling breeds in the Arctic regions, but after August it winters from California and Texas to Southern South America and various Pacific islands. It is about eight inches long; in winter the plumage is gray on the upper parts and pure white beneath. The three or four eggs are of a brownish-olive color, speckled with darker



SANDERLINGS

markings, and are laid in a tuft of weeds, or in a depression lined with dry grass.

SAN DIEGO, *de a' go,* CAL., the county seat of San Diego County and a health and pleasure resort, is situated in the extreme southwestern corner of the United States, 125 miles southeast of Los Angeles. It is located on the only landlocked, deep-water harbor between the Panama Canal and San Francisco Bay, and is the home port of important steamship lines operating vessels to the American Pacific coast and foreign ports. The Atchison, Topeka & Santa Fe Railroad enters the city from the north, and the San Diego & Arizona Railroad from the southeast. The population of 39,578 in 1910 had increased to 74,683 in 1920 (89 per cent gain). The area of the city is seventy-four square miles.

Parks, Buildings and Institutions. San Diego is a semitropical city, modern in every respect, yet having the atmosphere and charm suggestive of the Spanish period in America. In the center of the business section is the Plaza, a park bordered by date-bearing palms. Of several beautiful public parks, Balboa Park, containing 1,400 acres, is the most noteworthy. It extends along both banks of a deep arroyo (dry gully) in the northeastern part of the city. Here in 1914-1915 was held the Panama-California Exposition, the permanent improvements and buildings of which are valued at more than $2,000,000. The prominent public buildings of San Diego are the courthouse, the U. S. Grant and San Diego hotels, the handsome buildings of the state normal and the Polytechnic high school, the Federal building, Masonic Temple, Carnegie Library, bank buildings and churches.

In addition to the state normal school, the city contains the San Diego Army and Navy

Academy, the Philosophical School, a Federal aviation school and several private institutions. The largest hospitals are the Agnew, Saint Joseph, Paradise Valley and McNab.

Suburbs and Environs. Among the city's famous beach resorts are La Jolla and Coronado. The latter is built upon an enlargement of the neck of land protecting the harbor. It has the well-known Hotel del Coronado, with Japanese and botanical gardens and Tent City. On Point Loma, owned by the United States government, are Fort Rosecrans and coaling, quarantine and wireless stations. East of Coronado is the United States torpedo boat and submarine station. Imperial Valley, a section of vast agricultural possibilities, lies east of San Diego. It has many thriving towns, and its farmers and stock growers reach the large markets through San Diego.

Commerce and Industry. The city has an export trade valued at nearly $1,000,000 a year, while its imports are over $1,800,000. The leading industries of the city are those connected with the marketing of citrus fruits, especially lemons, and the manufacture of citrus products; meat products (canned sardines and canned tuna), lumber, onyx and marble products, ostrich feathers, salt, automobile tires and olive oil are other important manufactures. The combined factory products of the city are valued at $9,000,000 a year.

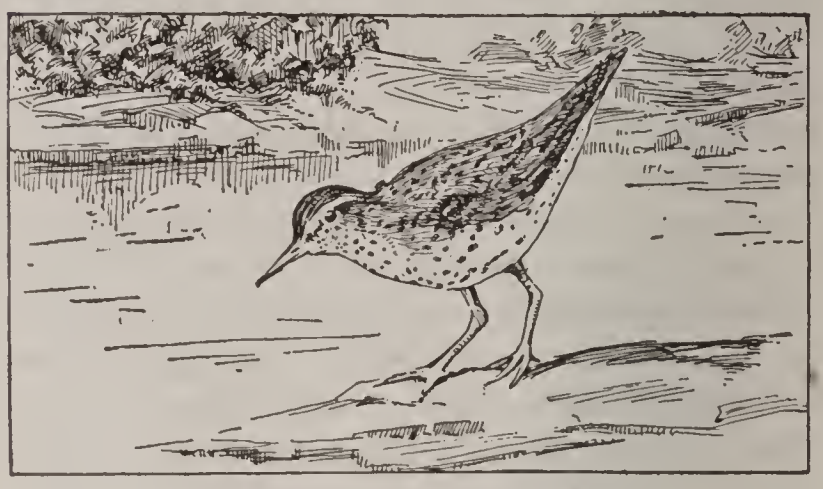
History. San Diego Mission, founded in 1769, was the first mission in California. The ruins stand about three miles north of the modern city. Old Town, the first settlement, stood west of the Mission, near the present city. A few of the old adobe dwellings remain, the best known of which is the one where Helen Hunt Jackson had her heroine, Ramona, married. Fort Stockton was established in 1846 by Commodore Stockton, who took possession in the name of the United States. Modern San Diego was incorporated in 1872 and was made a port of entry in 1873. The commission form of government, adopted in 1909, was replaced in 1915 by the city-manager plan (see the article CITY MANAGER). P.G.J.

Consult Smythe's *History of San Diego.*

SAND'PIPER, a small shore bird with a long, highly-sensitive bill with which it probes in the soft mud or sand for worms, shrimps, shellfish and soft mollusks. Sandpipers often follow the receding waves, singly or in flocks, searching for delicate bits, their graceful movements and cheerful cries endearing them to observers. Celia Thaxter wrote of the sandpiper in a poem, beginning:

> Across the lonely beach we flit,
> One little sandpiper and I.

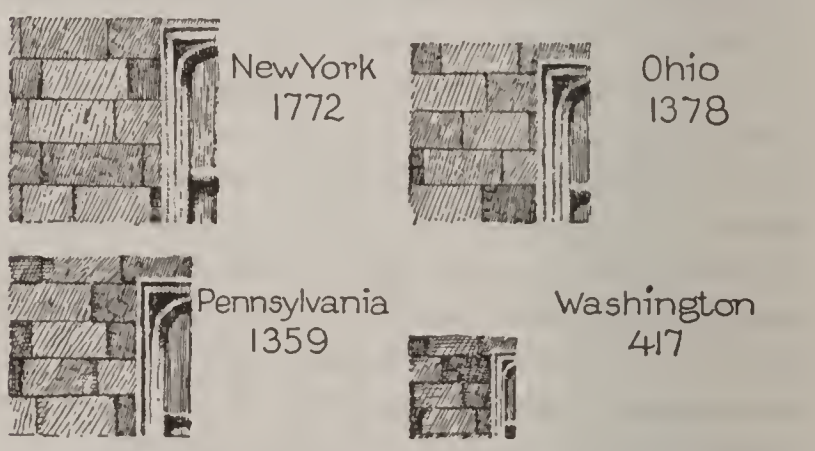
Sandpipers are found in all parts of the world; some species nest within the Arctic Circle. The eggs, three or four in number, are a light gray, buff or olive, boldly spotted with dark brown. The plumage of the birds, of



SPOTTED SANDPIPER

varying shades of buff, brown, gray, white and black, is modest but pleasing; one important species is spotted. The *knot, durlin, sanderling, ruff, pectoral* and *semipalmated* are well-known species.

SAND'STONE, a rock composed of grains of sand cemented together by some other substance, which may be carbonate of lime, silica or iron. The particles of sand were probably cemented under great pressure and under the influence of heat, though the temperature was not high enough to melt the substances. In the United States sandstone is found in large quantities in Northern New York, in Ohio, Pennsylvania, Washington, Iowa, Michigan and in the valley of the Connecticut River. There are extensive quarries in Nova Scotia and Alberta, Canada.



LEADING STATES IN PRODUCTION

The color of sandstone varies from light to dark brown. Varieties in which silica forms the cement have a glassy appearance, and in some localities this stone is quarried for use in the

manufacture of glass. Some varieties are of beautiful shades of gray, others are red or brown. Formerly brown sandstone was extensively used in the construction of palatial residences in New York and other cities. Some varieties are soft when taken from the quarry, but harden on exposure to the air. Sandstone is a good building stone, since it is easily worked and durable, but it is not desirable for structures in which great strength is required. The fine-grained varieties are used in making grindstones and whetstones. Among the best-known kinds of sandstone are the *Berea* of Ohio, the *Triassic brownstones* of the Connecticut Valley, the *Potsdam quartzite* of New York and the *Old Red Sandstone* of England.

Related Subjects. The reader is referred to the following articles in these volumes:

Building Stone	Glass
Geology	Stratified Rocks

SANDUSKY, *san dus' ki,* Ohio, the county seat of Erie County, situated on the south shore of Sandusky Bay, about five miles from Lake Erie. Toledo is forty-eight miles northwest and Cleveland is sixty miles east. The city is on the Baltimore & Ohio, the Cleveland, Cincinnati, Chicago & Saint Louis, the Lake Erie & Western, the New York Central and the Pennsylvania railroads, and has extensive electric interurban service. Steamers are operated to Canadian and United States lake ports during the greater part of the year. In 1910 the population was 19,989; it was 22,897 in 1920, a gain of 15 per cent.

Sandusky is well situated on sloping land overlooking an excellent harbor. Near the city are several islands; on Put-in-Bay is the Perry Memorial; Cedar Point is a summer resort with homes and clubs, and Lakeside is a famed Chautauqua resort. The courthouse and new $250,000 high school building are in a parked square in the heart of the city. Other prominent buildings are the public library, Ohio Soldiers' and Sailors' Home, the Masonic and Odd Fellows' temples, two hospitals and several churches. Other noteworthy features are the weather bureau station, the customhouse and United States fish hatchery, the latter at Put-in-Bay; there is a state hatchery at Lakeside.

Along the harbor are extensive loading docks. Coal and ore, sugar, lumber, fish, ice, grain, fruits, sand and lime are the principal articles of trade. The industrial establishments include shipyards and manufactories of iron and steel products, glass and cement, baskets, crates and barrels, underwear, dynamos, engines, strawboard, crayons and furniture. The total annual value of manufactured products is about $6,000,000.

Sandusky was settled in 1817, was incorporated as a city in 1845 and in 1915 adopted the commission form of government.

SANDWICH, Ont., the county seat of Essex County, on the Detroit River, opposite Detroit. It is two miles from Windsor, its banking point, and is connected with that and other cities by the Essex Terminal Railway. The town has a Dominion fish hatchery of importance, and it manufactures, among other articles, salt, robes and chemicals. Population in 1921, 4,419, a 92 per cent gain in ten years.

SANDWICH ISLANDS. When Captain James Cook discovered in 1778 a group of green-clad islands in the middle of the wide Pacific, he called them the Sandwich Islands, in honor of John Montagu, fourth Earl of Sandwich (1718-1792), who was then First Lord of the British Admiralty. This was the earl whose name survives as the inventor of that popular article of food, the "sandwich." As the islands became better known, however, and of more importance commercially, this English name was gradually replaced by Hawaii, applied by the natives to the group. See Hawaii.

SANDY HOOK, a low, sandy peninsula, about eighteen miles south of Manhattan Island, partly enclosing New York Bay and between the Atlantic Ocean and Sandy Hook Bay. It runs about six miles northward from the coast of New Jersey and is less than a mile in greatest width. Its northern extremity is guarded by a beacon light, and about one mile south of this there is a lighthouse ninety feet high. Fort Hancock is situated at the outermost point of the peninsula, a portion of which is also used by the United States government as a testing ground for heavy ordnance and armorplate.

SANFORD, Me., an industrial town of York County in the southwestern corner of the state, thirty-six miles southwest of Portland and ninety-two miles north and east of Boston. An electric line connects with the Boston & Maine Railroad, one mile distant. The town is on the Mousam River, which furnishes water power for a number of mills whose principal products are shoes, plush, linings, blankets, yarn, woolen goods, carriage robes and lumber products. The shoe factory of Sears, Roebuck Company is located here. Sanford was settled about 1740 and was incorporated in 1768. The population in 1910 was 9,049; in 1920 it was 10,691 (18 per cent gain). C.E.V.

SAN FRANCISCO, "the city loved around the world," is the principal seaport on the Pacific coast of America, situated on a hilly peninsula between the Pacific Ocean on the west and San Francisco Bay on the east. Golden Gate (which see) connects the bay and the ocean and bounds the city on the north.

San Francisco Bay, including its northern extension, San Pablo Bay, is fifty-five miles long and from three to twelve miles wide. It is the largest bay on the western coast of the United States and one of the greatest harbors in the world. On the eastern shore and directly opposite San Francisco are Oakland, Alameda and Berkeley, all connected with the larger city by ferries.

The story of the city is summed up in few words by Frank Morton Todd, an observer of American cities:

> Born a drowsy, Spanish hamlet, fed on the intoxicants of a gold rush, developed by an adventurous commerce, isolated throughout its turbulent history from the home lands of its diverse peoples and compelled to the outworking of its own ethical and social standards, San Francisco has evolved an individuality and a versatility beyond any other American city.

General Description. The city occupies an area about seven miles square and comprises the county of San Francisco. The site is hilly, and some of the elevations rise abruptly from sea level to altitudes of 400 to 900 feet. The ranges of hills are separated by nearly parallel valleys, and the diversity of surface imparts to the city a picturesque appearance. The streets are broad and straight and, with few exceptions, cross at right angles. Those in the northern, central and western parts of the city extend approximately north and south and east and west, but in the southern part most of the streets extend northwest and southeast and northeast and southwest. Market Street, the great thoroughfare, extends from the Ferry building southwest to Twin Peaks and divides the city into two nearly equal parts. The streets to the south of Market are parallel with it and at right angles to it, but those on the north extend north and south and east and west.

That portion of the site bordering on the bay is low and level, and the land on which the Ferry Building stands and that occupied by the docks and warehouses have been reclaimed by filling in. On the Pacific coast a ridge of sand dunes protects the city from the winds. Along the west side of the city extends the Great Highway, following the ocean for three miles and connecting with other drives and boulevards leading to all parts of the city. Electric and cable cars connect the business sections with all outlying points. The hillsides are dotted with beautiful homes. Whether it be approached from the bay or from the ocean San Francisco presents a beautiful appearance. Viscount Bryce, former British ambassador to the United States, says of it:

> Few cities in the world can vie with San Francisco either in the beauty or in the natural advantages of her situation; indeed, there are only two places in Europe—Constantinople and Gibraltar—that combine an equally perfect landscape with what may be called an equally imperial position.

From the summits of Telegraph Hill and Russian Hill, and from the reservoir near Twin Peaks, magnificent views of the city and its surroundings may be obtained.

Parks and Boulevards. San Francisco has over thirty parks and public squares, whose combined area is about 1,400 acres. Golden Gate Park, having an area of 1,013 acres, is one of the largest city parks in America. It has a frontage on the Pacific of about half a mile and extends inland for four miles. The park contains long drives, walks, lakes and hills whose summits offer fine views to the visitor. Nine baseball diamonds, a dozen tennis courts, handball courts, a completely equipped playground for children and a stadium enable the lovers of sports and play to satisfy their desire for exercise amid beautiful surroundings. Interesting plants from all parts of the world are found in the gardens and the collection of animals includes deer, elk and Alaskan moose. In the aviary are many rare and interesting birds,

and in the buffalo paddock is one of the finest herds of buffalo in the country. In the museum and art gallery are valuable collections of Oriental carvings, relics of Napoleon and a large number of specimens of interest to students of botany and zoölogy. The art collection includes works from some of the leading sculptors and painters.

Lincoln Park, occupying elevated ground in the northwest section of the city, is of interest because of the view it affords to the entrance to the harbor. To the north and east of Lincoln Park is the Presidio, a large military reservation and fortress. The Panama-Pacific-International Exposition was located just east of the Presidio. East of the exposition grounds is Fort Mason.

Important Centers. The Ferry Building, which is the great gateway to the city, is the point from which all lines of industry radiate. The building is an imposing structure 650 feet long, surmounted by a tower in which is a large clock. Here all the ferries crossing the bay make their landing. There are over 170 arrivals and departures of ferry boats every twenty-four hours, and these boats carry over 106,000 people into and out of the city. Street cars run from this point to all parts of San Francisco. The building is the headquarters of the California Development Board and the California State Mining Bureau, and the second story contains an elaborate exhibition of the resources of the state. Extending along the bay north and south of the Ferry Building are the long lines of wharfage where may be found ships from practically all parts of the world. The chief wholesale and manufacturing center lies west of the wharf and south of Market Street.

The retail district is on Market Street and adjoining parts of Geary, Kearney, Post, Stockton and Sutter streets and Grant Avenue. The chief business center is at the intersection of Geary, Kearney and Market streets. In the square formed by the intersection of these streets is Lotta's Fountain, where outdoor music festivals are held on Christmas Eve. Within a radius of two blocks are some of the most imposing business structures, including the San Francisco Stock Exchange, the United States Subtreasury and the building of the Standard Oil Company. In Union Square near by is a monument to Admiral Dewey. Hotel Saint Francis faces the square on the west.

The Civic Center, which begins at the intersection of Market Street and Van Ness Avenue, is surrounded by one of the finest groups of public buildings in the country. Here are the City Hall, the Municipal Auditorium, opera house, the museum, the State Building and the public library.

The great markets in which fruit, fish, vegetables and various other commodities are handled on a large scale form one of the distinguishing features of the city. The most important are the California Market, extending from California to Pine Street, and the Colombo Market on Dover Street.

Chinatown. In the heart of San Francisco is the foreign city, Chinatown. It occupies the section bounded by Kearney and Stockton streets and California and Pacific avenues, an area of ten city blocks, within which practically no whites dwell. Here the customs, rites and practices of the Chinese residents have full sway, excepting in slight modifications imposed by the United States government. Chinatown was destroyed by the great fire in 1906, and the old buildings have been replaced by modern structures. The chief interest is in the people, for here one may see China without crossing the ocean.

Other Buildings. In addition to the buildings to which attention has already been called there are many others deserving mention. First among these are the great hotels—the Palace, the Saint Francis and the Fairmont—hostelries

THE METROPOLITAN DISTRICT

1. Alameda
2. Berkeley City
3. Richmond City
4. San Rafael
5. Sausalito
6. San Mateo Co. Twp. 1

that are not surpassed by those in any other American city. The post office, a granite structure costing $5,000,000, survived the fire. The Hobart Building on Market Street, twenty-one stories high; the Pacific Building, one of the largest concrete office buildings in the world; the Humboldt Savings Bank Building, eighteen stories high; the Mutual Savings Bank Build-

ing; the Merchants Exchange Building; the Chronicle Building and the Hearst Building are all towering structures. The United States mint at Mission and Fifth streets is an imposing building designed in the style of the United States Treasury building at Washington. More gold has been coined in this mint since it was established than in any other in the country. The mint is open to visitors during certain hours every working day.

The principal churches include the First Congregational, the First Presbyterian, Saint Mary's Cathedral, Old Saint Mary's, Saint Luke's, Episcopal, and Temple Emanu-El. Mission Dolores, built in 1782 and restored in recent times, still retains a part of the old structure and is the oldest building in the city. Among the most attractive theater buildings are the Alcazar, the Columbia, the Cort, the Strand, the Orpheum, the Pantages and the Savoy.

Among the unique buildings are the Cliff House, jutting out into the sea near the Seal Rocks, on which sea lions can be seen at any hour in the day, and the Sutro Baths and Museum, a structure covering nearly three acres and containing the largest indoor swimming tanks ever built. Adjoining the baths are the Sutro Gardens, ornamented by many pieces of beautiful statuary.

Manufactures. In 1914 San Francisco was eleventh among the cities of the United States in its manufactures. The most important industries are meat packing, sugar refining, fruit canning and preserving, and the manufacture of machinery, glass and chocolate. Shipbuilding is an important industry, and one of the largest dry docks on the Pacific coast is located here.

Transportation and Commerce. Only one branch of the Southern Pacific Railway enters San Francisco. Oakland, across the bay, is the terminus of all the great transcontinental lines, but the excellent ferry service enables passengers and freight to reach the city without delay. There are regular lines of steamships plying between San Francisco and all the ports of the Orient and the Philippine Islands. Other lines are engaged in coastwise traffic and in South American trade, and the Panama Canal is increasing the ocean traffic between San Francisco, New York and other Atlantic ports, since it has shortened the ocean route between these cities by more than 7,000 miles. San Francisco has an extensive foreign trade.

Education. In addition to the public high schools, which are accredited by the University

Research Questions on San Francisco

(An Outline suitable for San Francisco will be found with the article "City.")

What, according to one writer, have been the chief causes of San Francisco's development of an "individuality and a versatility beyond any other American city?"

What are the great advantages of position which this city possesses?

Where does San Francisco rank among the great cities of the United States? (See list with article CITY.)

How does it rank among the seaports of the western coast?

What is the Golden Gate? Who named it? Give a brief description of it.

What two places in Europe, according to a distinguished Englishman, vie with San Francisco in beauty and advantage of position?

Locate these two places on a map of Europe, and see whether you can discover similarities between their situations and that of San Francisco.

What interesting form of animal life may be seen from the Cliff House in Golden Gate Park?

What distinction have the Sutro Baths among similar institutions?

Study the map of the city, and see whether you can tell why almost no railroads enter the city.

If you went to San Francisco on the Western Pacific, for instance, where would you leave the train? How would you reach San Francisco?

What shelters the city from the winds of the Pacific?

What animal, almost extinct except in zoölogical collections, may be seen in Golden Gate Park?

What is the Presidio?

What great exposition was held in this city? Where was it located?

How did the plan after which the buildings and grounds were laid out differ from that employed in most expositions?

What building has San Francisco that is 650 feet long?

What does its second story contain?

What foreign city exists within San Francisco? Why would you see practically none of the buildings there that you would have seen in 1905?

What important structure suggests in its architecture one of the buildings of the Federal capital? What is carried on in this building?

What is the oldest building in the city?

When was it built?

Who was the first man to enter San Francisco Bay?

What was the main object of the first comers to this region?

What was the first actual settlement made here?

To how many countries has this territory on which San Francisco is situated belonged?

When did it come into the possession of the United States?

What was the main cause of the very rapid development of this far western region?

What were the vigilance committees, and why were they necessary?

When was railway connection with the Eastern states completed?

of California and the Leland Stanford Jr. University, there is an excellent High School of Commerce. The city maintains a normal school for training teachers. The Cogswell Polytechnic College, the Wilmerding School of Industrial Arts, the California School of Mechanical Arts and the Lux School of Industrial Training for Girls are all institutions of a high order. The Conservatory of Music is widely known for its excellent work, and the universities mentioned above maintain professional schools of college grade in the city.

Population. Notwithstanding the disaster of 1906, San Francisco has had a steady increase in population. In the decade 1900-1910 its increase was from 342,782 to 416,912, and the official census of 1920 gave it 506,676 inhabitants. Like other large American cities San Francisco includes many different nationalities. By far the largest part of the population, however, consists of Americans, who are among the most wide-awake and progressive people of the country.

History. Some authorities believe that Sir Francis Drake entered San Francisco Bay some time between 1577 and 1580 (see DRAKE, SIR FRANCIS). The first entrance to the bay of which we have any record was made by Don Gaspar de Portola, governor of California, in 1769. The Spanish plan of colonization included three departments, the religious or mission, the military or presidio, and the civil or pueblo. The settlement of San Francisco began with Mission Dolores in 1776, the year of the adoption of the Declaration of Independence. A military post, the presidio, was established the same year. From its beginning the mission prospered and increased rapidly in numbers and wealth. In 1834 commercial interests began to control its affairs and from that date it declined. In 1836 the village of Yerba Buena was established on the bay about three miles from the mission. From this little business center San Francisco has grown to its present proportions.

Mexico, with California, became independent of Spain in 1832. The United States took possession of California in 1846, and the name of the town was changed to San Francisco the following year. The discovery of gold in 1848, at Coloma, in what is now El Dorado County, was the beginning of one of the most spectacular developments in American history. In 1849, $2,000,000 in gold was exported. San Francisco sprang from a town of 800 inhabitants to 10,000 in eighteen months. The worst and the best of men contended here for wealth. Buildings appeared like mushrooms, and the city was destroyed by fire five times in three years, 1849-1851. Crime became so flagrant that vigilance committees were organized to bring offenders to justice. San Francisco became a city in 1850 and the city and county were consolidated in 1856. The second great gold discovery, the Comstock lode in Nevada, came in 1859. In 1862 telegraphic communication was established with the Eastern states, and in 1869 the Union Pacific Railroad was completed, giving the city railway connection with the Atlantic seaboard. The foreign commerce, industries and population increased steadily from decade to decade until San Francisco, in 1916, was twelfth among the great cities of America.

An earthquake shock, which occurred on the morning of April 18, 1906, was followed by one of the most devastating fires known in history. In three days an area of four square miles in the heart of the city was reduced to ashes and a tangle of débris. Over 450 people lost their lives, and the loss in property exceeded $200,000,000. Measures for rebuilding the city on a grander scale and more substantial plan were at once perfected, and in less than ten years a new San Francisco had replaced the old. The city united with the state in extending to the United States government an invitation to have the Panama-Pacific-International Exposition held in San Francisco in 1915. The invitation was accepted and the exposition brought to the city thousands of visitors from all parts of the world (see PANAMA-PACIFIC-INTERNATIONAL EXPOSITION). W.F.R.

Consult Young's *San Francisco: A History of the Pacific Coast Metropolis;* Eldredge's *Beginnings of San Francisco.*

SANG'STER, CHARLES (1822-1893), a Canadian poet and journalist, one of the first of the native English-Canadian poets, and one who is credited with a considerable part of the national sentiment which resulted in Confederation. Beginning about 1860, when political conditions in the Canadas were at the worst, Sangster wrote many verses in which patriotism has a strong, if not always predominant, note. His poems were collected in two volumes, *The Saint Lawrence and Saguenay and Other Poems,* and *Hesperus and Other Poems and Lyrics.*

Sangster was born at Kingston, Ont. In his youth he was a newspaper editor at Amherstburg and later at Kingston, but in 1868 he accepted a position in the Postoffice Department.

For selections from his poems, see *Oxford Book of Canadian Verse.*

SANHEDRIN, *san he'drin,* the supreme council of the Jews, with authority over religious, civil and criminal cases. At the time of Christ it was made up of seventy-one members; they were presided over by the high priest and met daily near the Temple in Jerusalem. Jesus was tried before the Sanhedrin as a false prophet, and Peter, John, Stephen and Paul appeared before it on charges of religious error. After the fall of Jerusalem, in A.D. 70, the Sanhedrin declined in power and finally disappeared.

SANITARY SCIENCE. The purpose of sanitary science is to raise health standards, check disease and prolong life—in general, to make the world a safer and better place for the individual. Centuries ago epidemics of smallpox, cholera, the plague and similar diseases swept over countries and reaped harvests of countless victims because the great foe of these enemies of the human race—sanitation—was not understood. Sanitary science has to do with the ground on which houses are built, methods of ventilation, water supply, sewerage and drainage systems, quarantine, vaccination and other measures for preventing disease or checking its spread, and the personal habits of the individual. These various aspects of the subject are treated in these volumes under the headings listed below. They form a complete survey of the field of sanitary science.

Related Subjects. The reader is referred to the following articles:

Adulteration of Foodstuffs and Clothing
Antiseptic
Aqueduct
Baths and Bathing
Board of Health
Drainage
Fly
Food
Fumigation
Garbage
Health
Health Habits
Heating and Ventilation
Hygiene
Inoculation
Life Extension
Mosquito
Reservoir
Serum Therapy
Sewer and Sewerage
Sewage Disposal on Farms
Vaccination

SAN JACINTO, *ja sin'toh,* BATTLE OF, the final battle of the War for Texan independence, fought on the afternoon of April 21, 1836, near San Jacinto Bay, Tex. Santa Anna commanded a Mexican force of about 1,400, and the Texans, numbering about 740, were led by General Sam Houston. The Texans rushed to battle with the cry "Remember the Alamo," and speedily won a complete victory. Over 1,300 Mexicans were killed, captured or wounded, and Santa Anna was taken prisoner the following day. The Texan loss was only two killed and twenty-three wounded. See TEXAS, subhead *History;* ALAMO.

SAN JOAQUIN, *ho ah keen',* an important river of California, which has its source in a small glacier on the eastern slope of the Sierra Nevada Mountains. It flows southwestward, then in a northwesterly direction, traversing the fertile San Joaquin Valley, and meets the Sacramento River (which see) about sixty miles northeast of the Francisco, near its mouth on Suisun Bay. Its length is about 350 miles, 125 miles of which are in the mountains, and it is navigable throughout the year as far as Stockton, a distance of fifty miles; in winter and spring boats ascend about 200 miles farther. The valley of the San Joaquin, which is about 200 miles long and thirty miles wide, produces an abundance of grain and fruit, and is frequently called the "granary of California."

SAN JOSÉ, *ho sa',* the capital and largest city of Costa Rica, a republic in Central America. San José lies in a fertile agricultural valley, about midway between the eastern and western coasts, and is 3,868 feet above sea level. It is the principal station on the transcontinental railroad which has its Pacific terminal at the port of Punta Arenas, and its Atlantic terminal at the port of Limon. The city has many modern features, including macadamized streets and electric lights, and among its fine public buildings are a national library, a national museum, an Institute of Physical Geography, and one of the finest opera houses in Central America. It was founded in 1738 and, except at short intervals, has been the capital since 1823. Population, 1920, 38,930.

SAN JOSÉ, *ho sa',* CAL., the county seat of Santa Clara County, is a health resort and the chief city in the fine fruit region of the Santa Clara Valley. It is forty-seven miles southeast of San Francisco, seven miles south of San Francisco Bay, with which it has water connection, and on several branches of the Southern Pacific Railroad. The area exceeds eight square miles. In 1910 the population was 28,946; in 1916 it was 38,902 (Federal estimate).

San José is the seat of the University of the Pacific (Methodist Episcopal), the College of Notre Dame (Roman Catholic), a state normal school, and a number of private institutions. It has a fine stone Federal building, which cost $200,000, a courthouse, city hall, Hall of Justice, Hall of Records, Carnegie Library, Y. M. C. A. and Y. W. C. A. buildings, and the county and private hospitals. At Alum Rock Park (1,000 acres), seven miles distant,

are mineral springs and a municipal natatorium. The famous Lick Observatory (which see) is on the summit of Mount Hamilton, twenty-five miles by road east of the city.

The chief of the varied and abundant crops of the fertile Santa Clara Valley are prunes, apricots, peaches, cherries, grapes, olives, wheat and barley. The city has fruit-packing and shipping establishments, fruit-canning and drying plants, foundries and machine shops, marble-cutting works and manufactories of baskets and boxes, leather and wine and malt liquors. The value of fruit annually exported is about $15,000,000.

Spaniards founded the pueblo of San José (Saint Joseph) in 1777, and twenty years later the mission of San José was built. It came into possession of the United States in 1846 and from 1849 to 1851 was the capital of California. The city suffered from shock and fire at the time of the great San Francisco disaster in 1906. J.T.B.

Consult Mars's *Reminiscences of Santa Clara Valley and San José.*

SAN JOSÉ, *ho sa',* **SCALE,** the most destructive of the scale insects, commonly found on shrubs and fruit trees throughout the United States. The pest takes its name from that of San José, Cal., where it was discovered in 1880. It was believed to have been introduced on trees brought from China. The insect was not found east of the Rocky Mountains until three years after it was discovered in California, but by 1895 it had become widespread throughout the orchards of the Eastern states. At that time several of the European governments and those of Canada and South Africa prohibited the importation of fruits and plants from the United States to prevent the introduction of the insect.

The smaller an insect enemy, the more dangerous it is, because it is not discovered until it has made great headway. The San José scale is difficult to fight because of its minute size and its amazingly rapid reproduction. The largest insects are not larger than the head of a pin, and it has been estimated that one female scale may produce over 3,216,080,000 young insects a year. The branches of infected trees are literally powdered with their minute bodies, and as they exude a gray, scaly wax, the plants look as if coated with ashes.

The danger of the pest is increased by the great number of its food plants, which include orchard and small fruits, the members of the rose family, the pecan, the English walnut, the elm and other trees. The fruits of infected apple and pear trees show a reddish discoloration of the skin and are often rough, pitted and distorted in shape, or cracked. A full-grown apple tree may resist these insects for several years, but a young peach tree is often killed in two seasons.

The pest is spread by infected nursery stock; the scales are scattered by the wind and are carried on the feet of birds and flying insects. The Chinese ladybird beetle is a natural enemy of the pest, and the chalcidid fly destroys the adult scales. A mixture of lime, sulphur and salt, known as "California wash;" whale oil or fish oil soap containing potash lye; kerosene soap or crude petroleum, and hydrocyanic acid gas are used to destroy the insects. L.B.

Consult *Farmers' Bulletin No. 650,* United States Department of Agriculture; Johnson's *Fumigation Methods.*

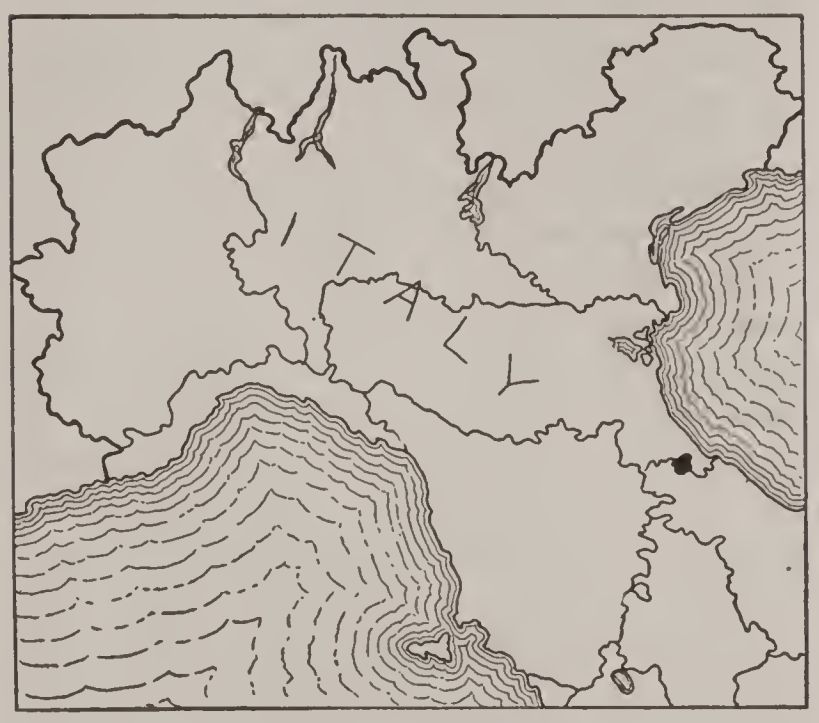
SAN JUAN, *hwahn,* the capital, largest city and chief seaport of Porto Rico. It is situated on a coral islet off the northern coast of the main island, the two being connected by the Bridge of San Antonio and a fortified causeway. Picturesque walls, 250 years old, surround the city, and the Morro Castle occupies a promontory on the western end. The deep bay between the city and the mainland provides one of the best harbors in the West Indies. San Juan was the seat of the Spanish provincial government, and has numerous fine buildings, including the customhouse, city hall, a cathedral, a large Dominican convent, a $100,000 Carnegie Library, a military hospital and barracks. The city is an important center of tobacco manufacture. The fortifications of San Juan were bombarded by the United States fleet under Admiral Sampson in May, 1898. Population, 1916, 48,716 (Federal estimate). See Porto Rico.

SANKEY, *sang'ki,* Ira D. (1840-1908), a gospel singer whose career was linked with that of Dwight L. Moody (which see).

SAN LUIS POTOSI, *sahn loo ees' po toh se',* a beautiful city in Mexico, the capital of the state of the same name. In population it ranks fourth among the cities of the republic, being surpassed by Mexico City, Puebla and Guadalajara. It is the seat of a United States consul. Almost hidden by luxuriant gardens, San Luis Potosi is situated on a plateau 6,200 feet above sea level, about 215 miles northwest of the City of Mexico. Many beautiful plazas, a magnificent cathedral and handsome public buildings ornament the city. Originally it became impor-

tant through the famous silver mines of San Pedro, in the vicinity, but these have been practically abandoned. At the present time the city has a good trade in pottery, mineral products and hides, and manufactures furniture, woolen goods, flour, soap, cigars and other commodities. The place was a center of the revolutionary disturbance beginning in 1910, and was captured by the Constitutionalists in 1914 (see MEXICO, subtitle *Government and History*). Population in 1914, 82,946.

SAN MARINO, *sahn mah re' no,* the oldest republic in Europe and one of the smallest nations in the world, is situated in a mountainous district of Northeastern Italy, about twelve miles southwest of the port of Rimini, on the



LOCATION MAP

The small black area in the east is the little republic.

Adriatic Sea. It has an area of about thirty-eight square miles, and it is said a cannon in the capital cannot be used to salute distinguished visitors for fear of committing an act of violence against its neighbor state, for the projectile might fall outside its boundaries. The capital, also known as San Marino, is situated at the summit of Monte Titano, about 2,650 feet above the sea. It is a small, old-fashioned town, whose streets, paved with flagstones, are so narrow and crooked that vehicles of any kind are used but little. The buildings as well as the customs of the town have remained almost unchanged since medieval times. In the public square, the social center of the town, are great cisterns filled with rain water, the only source of water supply. The chief occupations of the people are the raising of cattle and the making of wine. Stone is exported. The little republic issues its own postage stamps and copper coins.

The legislative assembly of the republic is a Great Council of sixty members, elected by popular vote. Every six months two executive officers, called Regents, are selected from the council members, and a smaller executive council of twelve members is chosen from their number every year. The republic has no public debt. A treaty of friendship, negotiated with Italy in 1907, was renewed in 1914, and San Marino followed Italy in declaring war against Germany in the War of the Nations (which see). The town of San Marino has been in existence since the fourth century. Pope Urban VIII formally acknowledged the independence of the state in 1631. Population of the republic in 1920, 12,027. M.W.

SAN MARTIN, *sahn mahr teen',* JOSÉ DE (1778-1850), a distinguished general and champion of South American independence, one of the most prominent figures in the wars which freed the countries of South America from the power of Spain. He was born in Argentina but educated in Spain, where he had his first taste of military service in a war with France. On hearing that the Spanish colonies in South America had rebelled, he hurried to Buenos Aires, organized the famous Mounted Grenadiers, and was given command of a large division of the patriot forces. In Chile he scored two brilliant victories over the Spanish army, at Chacabuco (1817) and Maipo (1818), which brought about Chilean independence.

Later he helped the Peruvians to win their liberty, and in 1821 was made Protector of Peru. He used his authority to accomplish some important reforms, both educational and political; but in the following year, although the idol of the people, he gave up the dictatorship to Simon Bolivar (which see) and left secretly for Europe. He later revisited his native country to find the republics warring among themselves, and as he had sworn never to fight in a civil war he immediately returned to France. There he lived quietly and almost in poverty until his death. L.M.B.

SAN SALVADOR, *sahn sahl va dohr',* the capital of the republic of Salvador, in Central America, was almost wholly destroyed in June, 1917, by an earthquake and volcanic eruption. The site of the city is in a pleasant valley twenty-five miles from the Pacific Ocean. This region has for centuries been subject to quakes, for in the vicinity there are eleven great volcanoes. San Salvador was twice destroyed previous to 1917—in 1854 and in 1873. Each time the people rebuilt their city, and after the

1917 disaster rebuilding plans were again started.

As the capital of the most densely populated republic of Central America (see SALVADOR), San Salvador was an important business and railway center. It had three banks and a number of manufacturing establishments, and carried on a thriving trade in coffee, tobacco, rubber, sugar and other agricultural products. The city was one of the most attractive in Central America, with picturesque adobe houses, in a setting of luxuriant growths of fruit trees and palms, spacious parks and tropical gardens. Among the many fine buildings were the national palace, where the legislature held its sessions, a handsome university building, the chamber of commerce, the Roman Catholic Cathedral and an astronomical observatory. The city maintained several hospitals and a number of charitable institutions. At the time of the last disaster its population was estimated to be 75,000. In 1921 San Salvador became a member of the short-lived Central American Republic, or Federation.

SAN'SKRIT LANGUAGE AND LITERATURE. Sanskrit was the sacred and literary language of ancient India. It is divided into two periods, Old Sanskrit, called Vedic Sanskrit or simply Vedic, in which the *Vedas* were written, and classical Sanskrit, the literary remains of which are chiefly on subjects other than religious. The time of the introduction of Sanskrit into India cannot be even approximately known, but 1500 B. C. is the date generally assigned. For a period, uncertain in its length, it was the common speech of the people as well as the literary language, but by the first or second century B. C. it had become merely classical, a means of communication, both written and spoken, between the learned, but entirely discarded as a language of the people. In this more or less artificial and classical form it exists to-day.

a काकौ वृक्षे वसतः b देवो वदति
c किमर्थंम्पितरम्पुत्रो न स्मरति

SPECIMEN OF SANSKRIT

Translation: (*a*) Two crows dwell in the tree; (*b*) The god speaks; (*c*) Why does the son not remember the father?

Its Position of Importance. Sanskrit may not be dismissed by the student of languages with a careless word simply because it has no present vital existence. Since it came to the knowledge of Europeans in the latter half of the eighteenth century it has exercised a profound influence on the scholarship of the world. Comparative philology, comparative mythology and comparative religion are the direct outgrowth of its study. For Sanskrit, by the very fact that it has survived through so many centuries as a merely formal speech, has not been subject to the constant changes which creep into the common speech of a people, and consequently preserves in purer form than any other of the Indo-European languages the characteristics of the common stock from which these all sprang. The real understanding of the development of such important languages as Greek, Latin, English and German has been made possible, therefore, largely by the possession of Sanskrit as a means of comparison.

Developed a Great Literature. Interest in Sanskrit is not due entirely to its linguistic value, for it possesses a literature well worthy of study for its own sake. In a wider sense this literature includes the *Vedas,* the sacred Hindu books which constitute the oldest work in any Indo-European language. Sanskrit literature proper, as distinguished from the Vedic, is entirely secular, as stated above, and its greatest monuments are the epics known as the *Ramayana* and the *Mahabharata.* Other epics less noteworthy than these exist, together with lyric and didactic poetry, narratives, and even dramas. Though the Hindus claim a great antiquity for their drama, there seems no real reason for placing its beginnings before the fifth or sixth century of the Christian Era. Nor is it possible to state that it was entirely a product of that country, many scholars seeing in it distinct traces of Greek influence. In general, the themes are taken from Hindu legend or history, and the characters are types rather than individuals.

Most interesting of all to students, however, are the beast-fables and fairy tales, for in these is evident a very close connection with such narratives in European languages. India seems to have been one of the earliest homes of the fable, and practically every fable *motif* which is found in European fables exists in some form in Sanskrit literature. Many of these Hindu tales are built on the story-within-story plan which the *Arabian Nights* has made familiar. Some of the stories of that famous book may be traced to their source in the tales of India, and many of the legends and tales of medieval Europe are of the same origin. A.MC C.

Consult Perry's *Sanskrit Primer;* Reed's *Hindu Literature, or the Ancient Books of India.*

SAN'TA AN'A, in Spanish, *sahn'tah ah'nah,* CAL., the county seat of Orange County, is in the southwestern part of the state thirty-three miles southeast of Los Angeles and ninety-two miles northwest of San Diego. It is on the Atchison, Topeka & Santa Fe and Southern Pacific railroads, and has electric service to the beaches and to Los Angeles. In 1910 the population was 8,429; it was 15,485 (Federal census) in 1920. The area is nine square miles. Prominent buildings include the fine county courthouse, city hall, a number of churches of architectural merit, the Polytechnic High School and Carnegie Library. Santa Ana has sugar-beet factories, packing houses, a cannery and an iron and brass foundry, and there is an important trade in fruit. A settlement made here in 1869 was incorporated as a city in 1886.

SANTA ANNA, *sahn'tah ah'nah,* ANTONIO LOPEZ DE (1795-1876), a Mexican soldier and statesman, who is closely associated with the early, varying fortunes of the Mexican republic, was born at Jalapa, in the province of Vera Cruz. Entering the colonial (Mexican) army of Spain as a cadet in 1810, he served as a supporter of the Spanish government till 1821, when he joined Iturbide in the effort to throw off the sovereignty of Spain. Iturbide made Santa Anna brigadier and governor of Vera Cruz, and this office he held until 1835.

Meanwhile, he figured variously as a supporter of Iturbide, then as his conqueror, and later as a follower of Guerrero, who overthrew President Pedroza. In 1829, as Minister of War and commander-in-chief of the army, he defeated the Spanish army which was attempting to restore the power of Spain, and ended the effort to reëstablish European authority in Mexico. His next move was to overthrow the government of President Bustamente, and on November 12, 1832, he defeated the latter at Casas Blancas. In the following February Santa Anna was chosen President, and though previous to this time, he had figured as a supporter of federalism, he forthwith abolished the Federal constitution and entered into relations with the monarchists. Insurrections followed and in 1835 Texas decided to revolt from Mexican authority and establish its own government. Santa Anna hastened to suppress this movement, attacking San Antonio early in 1836 and capturing the Alamo in March. But the Mexican army was defeated the next month at San Jacinto by Gen. Samuel Houston, and Santa Anna was taken prisoner. The Texans agreed to spare his life, and he left the country.

In November, 1838, Santa Anna defended Vera Cruz against the attack of the French, losing a leg in the battle, but increasing his popularity. In 1841 he was made military dictator, ruling thus till June, 1844, when he was elected constitutional President. In November, however, a rebellion was led by Paredes, and Santa Anna was defeated and banished. When war with the United States broke out in 1846, he was recalled and placed in command of the army. After the occupation of Mexico by Gen. Scott, Santa Anna resigned. In 1853, he was once more reënstated at President, but at the end of two years was again overthrown, and took refuge in Cuba. During the French invasion of Mexico in 1864 he attempted to return home, but was not permitted to do so until after Maximilian was killed and Juarez had died. He died in Mexico City in obscurity.

Santa Anna had a longer public career than any other Mexican politician excepting Porfirio Diaz. He was personally a man of great courage and an able soldier, but he was a master of intrigue, and of unstable principles.

Read TEXAS, subhead *History,* in addition to reference above. Santa Anna's relations with the United States are noted in the routine history of the Mexican War, beginning with the causes of that struggle. Benton's *Thirty Years' View* throws light on his character.

SANTA BARBARA, *san'ta bahr'ba ra,* CAL., the county seat of Santa Barbara County, 104 miles northwest of Los Angeles. It is on the Santa Barbara Channel opposite the islands of Santa Rosa and Santa Cruz, and is ideally located in a valley of the Santa Ynez Mountains opening out to the sea. Owing to the shelter of the mountains and the effect of the ocean, the climate is mild and healthful. The natural vegetation has been enriched with specimens from every part of the world; roses grow in profusion. The city is served by the Southern Pacific Railroad. In 1920 its population was 19,441, a gain of 67 per cent in ten years.

The surrounding region is agricultural, and the city has stock-raising and fruit-growing interests and large lemon-packing establishments. Near by is the old Santa Barbara Mission, founded by Junipero Serra in 1786, which, with its refectory, dormitory and lovely old garden, is still occupied by Franciscan monks. Prominent features are the Federal building, completed in 1914, a Carnegie Library (built in 1916), the State Normal School of Manual Arts, Saint Anthony's College, a courthouse, city hall, Saint Francis and Cottage hospitals, a Y. M. C. A. building, hotels and parks.

Governor Felipe established a presidio (military post) here in 1782. It was incorporated as a city about 1850. In 1915 the commission form of government was adopted. The water system is owned by the municipality. C.M.G.

SAN'TA CLAUS, *klawz,* the children's favorite name for good Saint Nicholas (see NICHOLAS, SAINT).

SANTA CRUZ, *sahn'ta krooz,* CAL., the county seat of Santa Cruz County, is a health and pleasure resort on the west coast of the state, eighty miles by rail southeast of San Francisco. It is located at the mouth of the San Lorenzo River and on the north shore of Monterey Bay, and is served by the Southern Pacific and Ocean Shore railroads and by several steamboat lines. The area of the city is nine square miles. In 1910 the population was 11,146; it was 10,917 in 1920, showing a loss of 2 per cent in ten years.

The city is situated on a slope rising gradually from the bay to hills north of the city, and among its attractions are an excellent beach, drives along the cliffs, and Sequoia Park, a celebrated forest of giant redwoods a few miles away. Santa Cruz has a city park of 200 acres, a hall of records, a courthouse, city hall and public library. The chief manufactures are gunpowder, lime, cement, asphalt, glue, leather and wood products. Fruit growing is the leading industry of the surrounding country. Santa Cruz Mission was founded here in 1791. The city was incorporated in 1876, and has adopted the commission plan of government.

SANTA FÉ, *sahn'ta fay,* capital of the Argentine province of Santa Fé, is situated on a channel of the Parana River, not far from the mouth of the Salado, and about 300 miles northwest of Buenos Aires. It is an important railway center, having connections with Rosario, Cordoba and Tucuman. The city is modern in appearance and possesses a Jesuit college, a university, substantial government buildings and a cathedral. Shipbuilding is an important industry, and there is a prosperous export trade in wool, lumber and cattle. Population in 1918 (including suburbs), estimated, 59,574.

SANTA FE, *san'ta fay,* N. M., state capital and county seat of Santa Fe County, situated at an altitude of 7,000 feet at the base of the Sangre de Cristo Range, in the north-central part of the state. It is entered by a branch line of the Atchison, Topeka & Santa Fe from Lamy, eighteen miles southeast, and by the Denver & Rio Grande and the New Mexico Central railroads. Las Vegas is eighty-three miles east by rail, and Albuquerque is eighty-six miles southwest. The population, among which are many Mexicans, was 7,236 in 1920.

With the exception of Saint Augustine, Fla., Santa Fe is the oldest European settlement within the present limits of the United States. It was founded by Spaniards in 1606. The site is said to be that of a prehistoric Indian pueblo. In the vicinity, in Pajarito Park, are remains of cliff, cave and communal dwellings. The oldest streets are narrow and crooked, bordered by one-story adobe houses. In the center of the town is the Plaza. Facing it on the north is a building called the "Palace," an old adobe one-story structure a block in length, built early in the seventeenth century. It was the home of Spanish, Mexican and United States governors until 1909. While governor of the territory (1878-1881), General Lew Wallace finished writing *Ben Hur* in the "Palace." The building now contains the historical museum of the Historical Society of New Mexico, the School of American Archaeology and the New Mexico Museum of Archaeology.

Other features of interest are San Miguel Church (like the "Palace," an important relic of the Spanish era), the Cathedral of San Francisco, the Rosario Chapel, ruined earthworks of Fort Marcy, north of the city, ruins of the Garita, once a Spanish fort, and long the site of a cemetery, the national cemetery, and an old adobe house said to be the oldest dwelling house in America. The prominent modern buildings of the city are the state capitol of brick and stone, completed in 1900 at a cost of $200,000, the Federal building, county courthouse and the Scottish Rite Masonic Cathedral. The city also contains the state penitentiary.

Santa Fe is mainly a residential town, with religious and educational interests. There are a number of modern churches and Saint Michael's College, the Loretto Convent, Allison Mission School, Mary E. James Mission School, school for the deaf and dumb, the government and Saint Catherine's Indian schools and the School of American Archaeology, which conducts a summer school for research among prehistoric Indian ruins. Santa Fe contains the state library and a city library, and has a number of hospitals and sanitariums treating a large number of patients who are attracted by the fine climate.

The old Santa Fe trail from Independence, Mo., to Santa Fe, N. M., established early in the nineteenth century, was an important trade

route between the East and West. The city is a distributing center, has some trade in filigree jewelry, Indian blankets and wool, and has stock-raising and mining interests. The Spaniards who settled here in 1606 worked gold and silver mines in the neighborhood. The settlement was captured by Indians in 1682, and they occupied it until 1693, when it was retaken by the Spanish. United States troops under General S. W. Kearny took possession in 1846. Five years later it became a city and was made capital of the Territory of New Mexico. N.E.S.

Consult Powell's *Historic Towns of the Western States.*

SANTIAGO, *sahn te ah' go,* the largest city of Chile, the capital of the republic and also of the province of Santiago, is picturesquely situated in a valley between the Andes and the Chilean coast range. It is sixty-eight miles southeast of Valparaiso, its port on the Pacific, and is built on the bank of a small branch of the Maipo River. Among several hills within the city itself is Santa Lucia, a steep elevation of red porphyry which has been converted into a public pleasure ground. On this crag the early Spanish settlers were besieged for six years by savage Araucanian Indians. Though the city lies in an arid region, by means of irrigation there are luxuriant growths of trees and flowers, and the Santa Lucia is but one of several large parks. Running through the center of Santiago is one of the handsomest boulevards on the South American continent, with rows of poplars on either side and many attractive statues. As a whole the city has broad, well-paved streets, and the newer buildings and private homes compare favorably with those of other large cities of the western world.

Among the conspicuous structures are the mint, the Hall of Congress, an imposing opera house, a cathedral and the buildings of the University of Chile, founded in 1743. Other educational institutions include the National Library, the National Museum, a botanical garden, an observatory and several professional schools. The city has excellent electric street-car service, a modern water-supply system, and railroad connections with Valparaiso, Concepción and Buenos Aires. In 1920 it had a population of 507,296, which is greater than that of any other city on the Pacific slope of the two Americas, with the exception of Los Angeles and San Francisco. The city suffered severely from a great earthquake in 1906. H.M.S.

SANTIAGO, Battle of, a naval battle fought off Santiago de Cuba, on July 3, 1898, during the Spanish-American War (which see). The United States fleet, commanded by Sampson and Schley, was unable to enter the harbor on account of strong fortifications, and stood guard before the entrance to prevent the escape of the Spanish fleet under Admiral Cervera. On July 3 the fleet attempted to make a dash from the harbor, but was pursued by the American squadron, and after a running fight six Spanish boats were destroyed or forced ashore. Admiral Cervera and over 1,300 officers and men were taken prisoners. The loss of life on the Spanish vessels was large, but only one was killed and only ten were wounded among the men of the American fleet.

SANTIAGO DE CUBA, *sahn te ah' go da koo' bah,* a seaport of the island of Cuba, capital of the province of Oriente. In the city's commercial importance it ranks next to Havana. In 1919 Santiago had a population of 70,232, as compared with 363,506 for Cuba's largest city. The town is situated on the Bay of Santiago, on the southeastern coast, and is 470 miles directly southeast of Havana, with which it is connected by railway. Its fine, deep harbor is five miles in length and has an average width of one and one-half miles. It is a good example of a landlocked harbor, the opening into the Bay of Santiago being in one place only 200 yards wide.

The city is situated on a slope at the base of the Sierra Maestra Mountains. The main business center is the Plaza de Céspedes, an open square around which are some of the principal buildings, including the cathedral and the municipal building. The streets of the city and all sanitary conditions were very unsatisfactory until Cuba, with the help of the United States, became an independent republic, and American capital made paving and other improvements possible. There are now in the city modern hospitals, a theater and a market. Most of the private dwellings are one story high and crudely made, but they are often made attractive by beautiful flower gardens.

Santiago is an important shipping center, exporting from the rich territory of Oriente a great deal of iron ore (50,000 tons to the United States each month) and other minerals, such as copper and manganese. The agricultural exports are sugar, coffee and tobacco. The iron mines of the district are very rich and employ over 4,000 workmen. Some of the ore is worked up at home in iron foundries.

In the Spanish-American War (which see) hostilities centered at Santiago, because the Spanish fleet was stationed in the harbor (see SANTIAGO, BATTLE OF). The city was attacked by American land forces under General Shafter, and it capitulated on July 14, 1898, eleven days after the destruction of the fleet outside the harbor.

SANTO DOMINGO, *sahn'toh doh ming'go,* or **SAN DOMINGO** (more correctly the DOMINICAN REPUBLIC), is the eastern and larger of the two republics on the island of Haiti (see map, page 2662). Its neighbor, the republic of Haiti, occupies but one-third of the island. Santo Domingo has an area of 18,045 square miles, which is a little greater than the combined area of Massachusetts and Vermont, and the census of 1921 gave it a population of 897,405. The people are mainly a mixed race of European, African and Indian blood, but there are in addition a number of Spanish creoles, and in the capital city are found many Turkish and Syrian dry-goods traders. Spanish is the prevailing language, but in most of the towns English is understood. The capital and largest city, Santo Domingo (described under its title), lies on the southern coast at the mouth of the Ozama River. It has (by 1921 census) a population of 45,021; other municipalities having 10,000 or more inhabitants are Santiago (71,956), Puerta Plata (26,073) and San Pedro de Macoris (25,226). The island was one of the first to be claimed by Spain, following its discovery by Columbus.

Santo Domingo is governed under a constitution adopted in 1844, which has been several times revised. The legislative power is vested in a Congress of two houses. The upper chamber, or Senate, has twelve members, and the lower, or Chamber of Deputies, twenty-four members, one Senator and two Deputies being elected from each province. Senators are chosen for six-year terms and Deputies serve for four years. The executive department consists of a President chosen by an electoral college for six years, and a Cabinet composed of the President and seven Ministers, each one of whom heads a department. There is no Vice-President, Congress selecting a successor to the President in case of his death. Each of the provinces is administered by a governor who is appointed by the President, and the governors in turn appoint various local officials. The state recognizes the Roman Catholic as the official religion, but religious liberty prevails. Primary instruction is free and is nominally compulsory, and the state also maintains several technical, normal and high schools. There are in the republic approximately 600 schools. In 1912 the National Bank of Santo Domingo was founded, and there are branches of the Royal Bank of Canada at Santo Domingo city and at Pedro de Macoris.

Customs duties are the chief source of revenue. The United States gold dollar is the monetary standard. Over three-fifths of the trade is with the United States, but in normal years Germany and the United Kingdom are

HOUSE OF COLUMBUS

Ruins of a house built in 1509 by Diego Columbus, son of Christopher Columbus, in Santo Domingo. It is the oldest structure in the western hemisphere erected by white men.

important buyers and sellers. The chief exports are sugar and cacao, with leaf tobacco, bananas, coffee, hides and skins, woods and beeswax next in order. Cotton goods, iron and steel manufactures, foodstuffs, chemicals and drugs, agricultural machinery and other manufactured products are imported. The principal ports are Santo Domingo, Puerto Plata and Sánchez. Interior facilities for communication and transportation are as yet inadequate, but the construction of roads and of railway lines is being pushed as rapidly as possible. In the republic there are in operation about 175 miles of railroad, besides 250 miles of plantation lines; there are over 700 miles of telegraph.

The Dominican Republic was proclaimed in 1844, and in 1865 its independence was recognized by Spain. The progress of the state has been hindered by political unrest, and because of the enormous debts and obligations to subjects of foreign nations incurred by the little nation, the United States assumed charge of financial affairs in 1905, according to the provisions of a friendly treaty. A serious revolt was quelled by United States intervention in 1913, and another uprising, in 1915, made necessary the dispatch of American war vessels to Dominican waters.

In the spring of 1916 the Dominican Congress voted to impeach President Enrique Jiménez for alleged violation of the constitution, and as a result of this action the garrison at Santo Domingo city revolted. To prevent civil war United States marines were dispatched to various parts of the republic, and in November a military government was proclaimed by the commander of the American marines at the capital. Martial law was to be in force until complete order was restored and a stable government assured. In June, 1917, Santo Domingo severed diplomatic relations with Germany, and proclaimed that its sympathies were with the United States in the War of the Nations. B.M.W.

For physical features, early history and climate, see HAITI. Consult Ober's *In the Track of Columbus.*

SANTO DOMINGO, the oldest existing European settlement in the New World, was founded in 1496 by Bartholomew Columbus, brother of the illustrious discoverer. It is the capital city of the republic of Santo Domingo, which occupies the eastern part of, and shares with the republic of Haiti, the second largest island of the West Indian group (see HAITI). Santo Domingo city is a seaport on the southern coast of the island, at the mouth of the Ozama River. The place, even at the present time, is typically Spanish. About it is an old wall used in early days as a defense against the raids of pirates and island natives. Most of the inhabitants dwell in thatch-covered cottages, but the picturesque ruins of great stone mansions tell a story of former grandeur. The streets are straight, but narrow and unpaved. One of the most interesting buildings is a large Gothic cathedral, where Columbus and his son Diego were formerly buried (see COLUMBUS, CHRISTOPHER). In the principal city square is a statue of the navigator. In the article SANTO DOMINGO, above, is an illustration of the ruins of the old Columbus home, erected by Diego.

Santo Domingo is important commercially as a center for the export of coffee and sugar. The harbor is not naturally well protected, but it has been improved by the erection, at the entrance, of a jetty and a sea wall. In 1913 a large concrete wharf was constructed. In 1921 the population was 45,021.

SANTOS, *sahN'toosh,* one of the busiest seaports in South America, is situated in the Brazilian state of São Paulo on the Atlantic coast, 200 miles southwest of Rio de Janeiro and twenty-five miles directly southeast of the city of São Paulo, of which it is the port. Santos is the first port in the world for the export of coffee, shipping out the vast output of the state of São Paulo. The wide, deep bay on which the city is located provides a harbor which can accommodate the largest vessels, and great sums of money have been spent on improvements, including a wall of stone and cement along the water front. Railway connection is had with the interior by way of São Paulo (which see). Santos is an attractive city with many fine public buildings, but is situated in a region naturally unhealthful. Epidemics, however, have been checked to some extent by the construction of a good drainage system, and the population has greatly increased. Population, 1914, estimated, 90,000.

SANTOS-DUMONT, *sahn'tohs du mawN',* ALBERTO (1873-), a French aeronaut, a leader in the development of the flying machine, was born at São Paulo, Brazil. He received his education in France, and after his father's death resided in Paris. His first experiment in flying was made in 1898 in a spherical balloon. Soon he had perfected a dirigible balloon, but his first trial with this ended in failure. In 1899, with another balloon he made a long, successful flight, which included the encircling of the Eiffel Tower, proceeding from Vaugirard to Bagatelle.

SANTOS-DUMONT
In the early days of air navigation he made his name famous, but he was later eclipsed by the Americans, the Wright Brothers and Curtiss, and by the Frenchmen, Blériot and Nieuport.

Santos-Dumont won the Henri Deutsche prize of 100,000 francs, in 1901, for his trip from the Aero Club around the Eiffel Tower and back, which he made in twenty-nine and one-half minutes, the time set for the flight being one hour. The following year he attempted to cross the Mediterranean, but an accident sent both himself and his balloon into the Bay of Monaco. He received the Chevalier Legion of Honour in 1904 and the Officer's Cross in 1909. His account of the work accomplished is found in his volume, *My Airships: A Story of My Life.*

SÃO FRANCISCO, *souN frahN seesh' koo,* or **SAN FRANCISCO,** a river of Eastern Brazil. It rises in the state of Minas Geraes and flows northeast, then eastward, forming the boundary between the state of Bahia and Pernambuco; it then turns to the southeast, finding an outlet in the Atlantic Ocean 1,800 miles from its source. Navigation on this great river is interrupted in several sections. As it leaves the mountains in Minas Geraes it plunges over falls and rapids; for 1,000 miles of its middle course it is a broad, navigable stream, but 200 miles from the Atlantic it again becomes turbulent, for it makes its way over a series of rapids and a magnificent cataract called the "Niagara of Brazil." Beyond this the river valley becomes a deep, narrow canyon, and ocean ships can navigate only the last 135 miles of the stream. Transportation along the unnavigable portions of the river is by railroad.

SAÔNE, *sohn,* a river in the east of France, rising in the Faucilles Mountains, in the department of Vosges. It is the most important branch of the Rhone, which it joins at Lyons. Chalon-sur-Saône, the second largest industrial city of Burgundy, is also on its banks. The Saône is 300 miles in length, and is navigable for light vessels for 232 miles. It is connected with the Seine, the Meuse, the Moselle, the Loire and the Rhine by canals. The ancient Celtic name of the river was *Arar.*

SÃO PAULO, *souN pou'loh,* third in size of South American cities, ranking next to Buenos Aires and Rio de Janeiro. It is one of Brazil's most rapidly-growing and prosperous communities, and has the reputation of being one of the cleanest cities in the two Americas. No city in the New World is better built or provided with more beautiful public buildings or more attractive tree-lined avenues. Situated just at the boundary between the tropics and the south temperate zone, twenty-five miles in a direct line from the sea and nearly 3,000 feet above it, São Paulo is as well suited for the residence of white men as any spot in South America.

The city owes its progress to the wealth of the great state of the same name, of which it is the capital. From this state is shipped more than half the world's coffee, through the port of Santos, twenty-five miles southeast (see SANTOS). The city of São Paulo is the railway center of the state, and has railway connection with its port, with Rio Janeiro on the northeast, Buenos Aires on the southwest and the vast interior states of Matto Grosso, Goyaz and Minas Geraes. A map of the new railroad to Matto Grosso, which opens a very rich territory for the merchants and manufacturers of São Paulo, appears in the article BRAZIL. Because of the territory which the city serves, it is already the greatest manufacturing center in Brazil.

Though São Paulo was founded in 1554, it was the home of only 23,000 people in 1872. Between 1890, when its number was only 65,000, and 1893, the population doubled; in 1911 it was 450,000; in 1919 it was 504,300.

SAP, in botany, a juice that circulates in plants as blood does in animals. Sap is sometimes called the "blood of the plant." As the animal has impure and pure blood, so does the plant have *crude* and *eleborated* sap. The crude sap consists of water in which are dissolved the elements of plant food taken in from the soil by the roots. The elaborated sap contains this food and other elements of nutrition received from the atmosphere in a digested state ready to nourish the plant.

Circulation of Sap. The crude sap is taken up by the roots, and it ascends to the branches and leaves. In the leaves it loses a great part of its water, which passes into the air. In the cell of the leaf, under the action of sunlight, the food elements taken in by the roots undergo a change which fits them for nourishing the plant. In this process the crude sap is transformed into elaborated sap (see LEAVES, subhead *The Work of the Leaf*). The elaborated sap is usually thicker than the crude. It moves inward from the leaves to the branches and down the branches to the main stem, and down that to the roots.

The circulation of sap is most easily understood by studying it in a tree. The trunk of a tree has two kinds of wood—a layer of light colored, soft wood next to the bark, known as the *sapwood,* and a center of darker, heavier wood, sometimes called the *heartwood.* The crude sap ascends through the sapwood. The heartwood has ceased to grow, but in a sound tree it contains more or less sap. The elaborated sap descends between the sapwood and the bark, leaving a thin coat which resembles mucilage and which in due time becomes the new layer of wood for the season. In some trees, particularly the willow, the hemlock and the elm, this layer so loosens the bark that in early summer it is easily stripped from the tree. In the spring, boys make use of their knowledge of this fact in stripping the bark from willow twigs and making whistles.

Economic Uses. Many plants yield sap of economic value. The sugar of commerce is made from the sap of the beet and the sugar cane, and from the sap of the sugar maple syrup and sugar are obtained. Certain drugs, of which opium from the juice of the poppy is a good example, come from the sap of plants. Some plants yield fluids which are not true sap from the botanical viewpoint, that are also of great value. Of these the juice of the rubber tree, from which most of the world's rubber is made, and the gums and resins are the most valuable in the arts.

Related Subjects. The reader is referred to the following articles in these volumes:

Leaves
Opium
Resins
Rubber and Rubber Manufacture

SAPAJOU, *sap'a joo,* a group of American monkeys which are among the most intelligent of those inhabiting the New World. The largest are over forty inches in length, including twenty inches of tail. The monkeys that are carried about the city streets by organ grinders are usually sapajous. In South America the Indians capture them by shooting poisoned arrows, the substance used being curare. The captured monkeys are then given salt, which overcomes the effect of the poison. Among the important kinds of sapajou are the *white-fronted,* found in the forests near the sources of the Amazon River, and known by their white forehead and light brown color; the slender *spider* monkeys, occurring in the region between Southern Brazil and Central Mexico, and remarkable for their agility; and the *weepers,* or *capuchins,* which have the hair arranged on the head like a cowl, or friar's hood. In general, these monkeys are tree dwellers and live chiefly on insects and fruit, though eggs, young birds and reptiles are sometimes eaten. South American Indians hunt them both for their flesh and their fur. See MONKEY.

SAPPHIRE, *saf'ire,* a beautiful, transparent blue gem, ranking next to the diamond in hardness, and approximately equal to that stone in value. Sapphires vary in color from pale blue to deep indigo, but the most valuable stones have the tint of the cornflower. Yellow and white specimens, with the blue distributed in spots, are not uncommon. The sapphire is a variety of corundum and is of about the same composition as the ruby, though somewhat harder than the latter. The chief sources of the gem are Siam, Burma, Ceylon, Kashmir, Australia, North Carolina and Montana. The latter state supplies the greater part of the product for the American market, and one of the richest mines in the world is near the city of Great Falls. The museum of the Botanical Garden of Paris contains a fine collection of sapphires. The gem is the birthstone for September. Its exceeding beauty is suggested in a passage from Milton's *Paradise Lost,* where the stars are compared to sapphires:

> . . . . . now glowed the firmament
> With living sapphires; Hesperus, that led
> The starry host, rode brightest.

Consult Kunz's *The Curious Lore of Precious Stones;* or his *Gems and Precious Stones of North America.*

Related Subjects. The reader is referred to the following articles in these volumes:

Birthstones
Corundum
Diamond
Gems

SAPPHO, *saf'o,* a celebrated Greek lyric poetess who lived in the seventh and sixth centuries B. C. She spent most of her life in Lesbos, and was called the "Lesbian nightingale." As head of a coterie, or school, of girls who devoted themselves to writing verse, she exercised much influence on the literature of her time. Indeed, the ancients admired her most extravagantly. Aristotle placed her in the same rank with Homer, and Plato called her the "tenth Muse," while Solon, on hearing one of her poems read, exclaimed that he would not willingly die until he had learned it by heart. Her lyrics were passionate songs of love and nature, and were arranged in nine books, one for each of the nine Muses. Of her poems only two have come down to us entire—a beautiful *Ode to Venus* and an ode descriptive of the emotions of love. Various fragments remain, but their exquisite beauty cannot be shown in any translation.

Consult Wright's *Short History of Greek Literature.*

SAPSUCKER, *sap'suk er,* a group of birds of the woodpecker family, found only in North America. They are so called because they feed on the sap of trees, which they obtain by making holes in the bark. The most common species is the *yellow-bellied sapsucker,* the male of which has a bright scarlet crown and throat, and black coat with white markings. This sapsucker nests in the Northern United States and Canada, migrating southward in winter as far as Central America. It builds its nest in holes in trees, and the eggs, which are pure white, are five to seven in number. The *red-breasted sap-*

sucker and *Williamson sapsucker* are species found west of the Rocky Mountains.

Sapsuckers have in general the habits of woodpeckers. See WOODPECKER.

YELLOW-BELLIED SAPSUCKER

SAPUL'PA, OKLA., the county seat of Creek County, is a rapidly-growing city in the rich oil district in the northeastern part of the state. The population of 8,283 in 1910 had increased to 11,634 in 1920, a 40 per cent gain. The area of the city is two and one-half square miles. It is fourteen miles southwest of Tulsa and 105 miles northeast of Oklahoma City, and is a division point of the Frisco Railway, which branches here in three directions.

Sapulpa, named for an old Indian resident, was settled about 1894 and became a city three years later. It contains the Euchee Indian Mission (supported by the government), a school occupying five splendid buildings on a campus of forty acres. The leading industrial establishments are railroad shops and yards, immense oil refinery, cotton gins, a cotton compress, machine shops, oil-well supply shops and manufactories of mattresses, confectionery, cigars, bricks and glass. Sapulpa adopted the commission form of government in 1911, and the city owns the water system. J.H.C.

SARACENS, *sair'a senz,* a name applied to various peoples by the European writers of the Middle Ages. The Mohammedans of Palestine and Syria, the Arab Moors who set up a kingdom in Spain in the eighth century, and the Seljuk Turks against whom the Crusaders fought were all known as Saracens. The name was originally applied by the Greeks and Romans to wandering Arab tribes of the Syro-Arabian desert, who were a disturbing element along the frontiers of the Roman Empire.

Related Subjects. In connection with this article on the Saracens, the reader may consult the following topics in these volumes:

Crusades	Saladin
Mohammedanism	Seljuks
Moors	Spain, subtitle *History*

SARAGOSSA, *sahr a gos'a,* a prosperous commercial city in the northeastern part of Spain, capital of the province of the same name. It is situated on the right bank of the Ebro River, 212 miles northeast of Madrid, and occupies the site of an ancient town of the Iberians. The name of the present city comes from *Caesarea Augusta,* which the Emperor Augustus applied to the settlement in 25 B. C., when he made it a Roman colony. In respect to appearance, Saragossa is said to be the oldest and the newest Spanish city, for around the central portion, with its crooked lanes and dilapidated houses, has been built a modern section with fine, broad avenues and handsome homes and buildings. There are several fine churches and schools, including a university founded in 1474.

The city is important as a railroad center and as a center of trade for a fertile farming region. Its industrial establishments include iron foundries, machine shops, flour and paper mills and manufactories of glass, chemicals, soap and candles. Saragossa was once the capital of the old kingdom of Aragon (see CASTILE AND ARAGON). During the war with Napoleon the city sustained a heroic siege (1808); one of its defenders, the "Maid of Saragossa," figures in Byron's poem, *Childe Harold.* Population in 1918, 117,742.

SARATOGA, *sair a toh'ga,* BATTLES OF, two engagements of the Revolutionary War, fought on September 19 and October 7, 1777, in the vicinity of Saratoga Lake, New York. The second was called by the historian Creasy one of the fifteen decisive battles of the world. These battles were important factors in a campaign planned by the British, the objects of which were the conquest of New York state, the crushing of Washington's army and the separation of New England from the rest of the colo-

nies. Three armies, under Burgoyne, Saint Leger and Lord Howe, were to meet in the neighborhood of Albany and make a concerted effort against the Americans. Burgoyne marched from Canada by way of Lake Champlain in May, and on the thirteenth of September crossed the Hudson River and took a position near Bemis Heights, where an American army under General Gates was stationed. On the nineteenth Burgoyne advanced with a force of 4,000 to attack the American left, but his army was intercepted at Freeman's Farm by 3,000 soldiers under Benedict Arnold, and an indecisive battle lasting two hours followed. Each side lost from 600 to 1,000 men. Because of the geography of the region, this engagement has been called the Battle of Freeman's Farm, the first Battle of Bemis Heights, the first Battle of Stillwater and the first Battle of Saratoga.

In the meantime Saint Leger had been so harassed by the Americans in the vicinity of Fort Stanwix that he had retreated to Lake Ontario, and Howe had been prevented by Washington from sending reënforcements to Burgoyne or coöperating with him. The latter, too, found that his supplies were cut off, and he therefore decided to risk another battle. On October 7 he led a force of 1,500 against the Americans, and was defeated in a battle in which Arnold took command of the colonial forces. The British retreated to Saratoga Heights, and there, on October 17, Burgoyne surrendered to General Gates the remnant of his army, about 6,000 men. B.M.W.

Consult Creasy's *Fifteen Decisive Battles of the World.*

Related Subjects. The reader is referred to the following articles in these volumes:

Arnold, Benedict
Burgoyne, John
Fifteen Decisive Battles
Revolutionary War in America

SARATOGA SPRINGS, N. Y., one of the most popular pleasure and health resorts in America, because of its curative waters, which attract many visitors and are shipped to all parts of the world. It is located in Saratoga County, in the east-central part of the state, thirty-eight miles north of Albany, the state capital, and twelve miles west of the Hudson River. Transportation is provided by the Boston & Maine and the Delaware & Hudson railroads and by electric interurban lines. In 1910 the population was 12,693; according to the Federal census it was 13,181 in 1920, a gain of four per cent. The area of the city exceeds three square miles.

There are between forty and fifty natural springs distributed in three groups, one in the city, one about a mile north and another the same distance south. Because of borings which lessened the force of these springs, the state, in 1909, made reservations of about 340 acres in the territory where they occur. The water from all of the springs and wells is highly saturated with carbonic acid gas, and its medicinal qualities are due to this and other chemical properties. It is especially recommended in the treatment of rheumatism, indigestion and heart and arterial disorders.

The city has a number of finely-equipped hotels, in which more than 20,000 guests can be accommodated. It has also a large Convention Hall seating 5,000, a town hall, a state armory, a school of arts, an Athenaeum and several public libraries. In the city park, covering ten acres, are the Casino and the Trask Memorial Fountain with its fine bronze figure, *The Spirit of Life,* the work of Daniel Chester French. There are several charitable institutions and hospitals. Near the city is a fine race course, and about four miles southeast is beautiful Saratoga Lake, a favorite resort. The bottling and shipping of the mineral water and the manufacture of medicines and drugs, silk gloves, furniture, paper-mill machinery and foundry products are the leading industries.

The word *Saratoga* is derived from the Indians and is said to mean *hillside country of the great water.* The springs were known to the Indians long before the coming of white men. In the vicinity were fought several Indian battles, and twelve miles distant is the battle field which witnessed the surrender of Burgoyne to Gates, on October 17, 1777. A large district, which included the springs, was ceded to the Dutch by the Indians in 1684. The first settlement was made in 1770, the first hotel built in 1774, and in 1826 Saratoga Springs was incorporated as a city.

SARATOV, or **SARATOFF,** *sa rah' tohf,* the capital of the Russian government (province) of the same name, and one of the most important cities of Eastern Russia, is picturesquely situated on the heights which rise from the right bank of the Volga River, 450 miles southeast of Moscow. It is a well-built city, with good streets, an imposing cathedral and several fine public buildings. Agriculture, gardening and manufacturing are the principal industries; the industrial establishments include flour mills, oil works, railway shops and tobacco factories. An Orthodox Greek bishop and a Roman Catho-

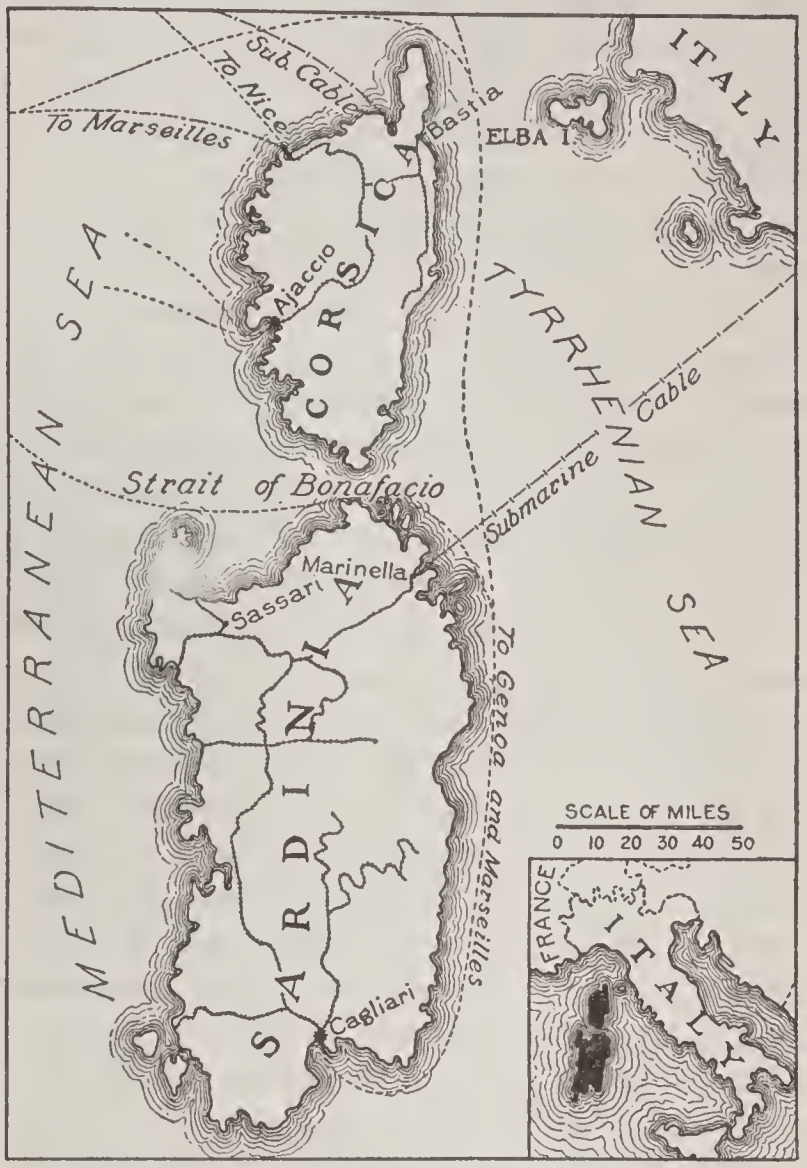
lic bishop have their residence in Saratov. Population, 1918, 217,400.

SARCOPHAGUS, *sahr kahf'a gus,* a stone coffin which is usually placed in a vault or tomb instead of being buried. The marble receptacles containing the bodies of George Washington and his wife, which may be viewed in the family vault at Mount Vernon, are examples of sarcophagi. The name, which is from a Greek word meaning *flesh-eating,* refers to an ancient belief that coffins made out of a certain stone found in Asia Minor would consume the bodies placed within them. The sarcophagi of the ancient Egyptians, who regarded these caskets as the homes of their dead, are the oldest known. The bodies of the kings who built the Pyramids for their tombs were placed in mummy cases, and these cases placed in great, hollowed-out blocks of granite. The cover of the stone receptacle often had the form of a curving roof, to carry out the idea of a house. Later the sarcophagus itself was fashioned to resemble the swathed mummy. The Greeks and Etruscans followed the custom of elaborately decorating the sides of their stone coffins with figures in relief. See list of related subjects, following the article BURIAL.

SARDANAPALUS, *sahr da na pa'lus.* See ASSURBANIPAL.

SARDINE, *sahr deen',* a small, olive-green fish from two to four inches in length, which is of great commercial value because of its fine flavor. It is a member of the herring family. Sardines are marketed in canned form, and are put up in oils, especially olive oil. The most important fisheries are found along the coasts of the Mediterranean Sea and the coast of the Bay of Biscay, France. In the United States young herring and menhadden are packed in oils and marketed as sardines. A species related to the European fish—the *California* sardine—is abundant on the American Pacific coast and is a valuable food fish, but it is not canned. The California sardine grows to be a foot long, and is dark bluish on the upper parts and silvery below. The following operations take place in the preparation of canned sardines: After the entrails have been removed the fish are washed, dried and placed in boiling oil. They are then drained and packed in tin boxes which are filled with pure olive or other oil. After the lids are soldered on the boxes are placed in boiling water or subjected to the fumes of hot steam. *Sardines anchoisées,* or sardines cured in red wine, are a delicacy known in the south of France (see HERRING).

SARDINIA, *sahr din'i a,* an island in the Mediterranean Sea, belonging to the kingdom of Italy. The island of Corsica, birthplace of Napoleon Bonaparte, lies directly to the north, the two islands being separated by the Strait of Bonifacio, nine miles wide; 115 miles northeast of the northeastern extremity of Sardinia lies the nearest point of the Italian peninsula.



SARDINIA AND VICINITY
The small corner map shows location of Sardinia and its sister island, Corsica, with respect to the mainland.

Only one of the Mediterranean islands—Sicily—is larger than Sardinia, the area of which, including the coast islets, is 9,306 square miles—almost exactly that of the state of New Hampshire. It is irregularly oblong in shape, and is 168 miles in length and about half as wide.

Commercially, Sardinia is important chiefly for its minerals and agricultural products. Mountains are found in nearly all parts, but those in the southwestern section have the richest mines. Lead, silver, zinc, antimony, lignite, granite and salt are the chief products of the mines, and the annual yield is valued at about $4,000,000. Wheat, oranges, olives, lemons and grapes are raised on the fertile plains between the mountains, and the raising of cattle is rapidly increasing in importance. About one-fifth of the land is forest-covered. The island has railroad

facilities and carries on a prosperous foreign trade, exporting minerals, wines, goatskins, olives, salt and fish, and importing coal, cotton and woolen goods and a variety of manufactured articles.

For administrative purposes Sardinia is divided into two provinces, Cagliari and Sassari. The capital of the island, Cagliari (which see), is a city of 61,175 inhabitants. Sardinia formed a part of the kingdom of Sardinia, the nucleus of the present Italian kingdom (see SARDINIA, KINGDOM OF). In 1915 it had a population of 880,863.

Consult Flitch's *Mediterranean Moods: Footnotes of Travel.*

SARDINIA, KINGDOM OF, a former Italian kingdom, which became the nucleus of the United Italy. It was made up of the islands of Sardinia and Caprera, the principality of Piedmont, the county of Nice, the duchies of Savoy, Aosta, Genoa and Montferrat and part of the old duchy of Milan. By a treaty made with Austria in 1720, the Duke of Savoy gave up Sicily, but gained in exchange Sardinia and acquired the right to constitute his dominions a kingdom. Sardinia, though it gave its name to the new realm, was by no means the important part, for the capital was Turin, in Piedmont, and there the affairs of the kingdom centered. The first king of Sardinia was Victor Amadeus I, who ten years after the formation of the kingdom abdicated in favor of his son, Charles Emmanuel I. During his reign some additions of territory were made.

Savoy was invaded by the French in the Revolutionary period, and that duchy, together with Nice, and, later, Piedmont, were surrendered to France. Indeed, when Victor Emmanuel I came to the throne in 1802, nothing but the island of Sardinia remained to him. The readjustment after Napoleon's downfall gave back the original territory, adding that of the Republic of Genoa, but Victor Emmanuel I was very unpopular because of his unliberal policies, and in 1821 he was forced to abdicate. Charles Albert, who came to the throne in 1831, granted liberal reforms to his people, and in 1848, the year of general revolution, put himself at the head of the forces which were trying to free Italy from the Austrians. In the next year he was defeated at Novara, and in consequence abdicated in favor of his son, Victor Emmanuel II. It was during the reign of this king that the struggle for freedom and a united Italy reached its climax, and he was made head of the new government.

Related Subjects. In connection with this article on the kingdom of Sardinia, the reader may consult the following topics in these volumes:

Genoa	Sardinia
Italy, subtitle *History of Italy*	Savoy, House of
	Turin
Piedmont	Victor Emmanuel II

SARDONYX, *sahr'doh niks,* a precious stone consisting of alternate layers of white and red or reddish brown, the red layers being partially transparent. Sardonyx is a variety of onyx. It was formerly used for the stone in signet rings. It is supposed that a sardonyx was one of the stones in the breastplate of the high priest of the Israelites (*Exodus* XXVIII, 20), but this is a matter of uncertainty, because we do not know whether the name was then given to the same stone as now. Sardonyx is mentioned by Saint John in his description of the Holy City (*Revelation* XXI, 20), as the fifth of the foundation stones. Some theologians consider sardonyx to be the emblem of spiritual strength. It has been a popular birthstone in all the ages.

Consult Kunz's *The Curious Lore of Precious Stones.*

Related Subjects. The reader is referred to the following articles in these volumes:

Birthstones	High Priest
Gems	Onyx

SARDOU, *sahr doo',* VICTORIEN (1831-1908), a French dramatist, born in Paris. He was too poor to complete the medical education he attempted to secure, and gained a livelihood successively as tutor and as a writer of reviews and articles for popular encyclopedias. His first dramatic attempts were far from successful; his troubles induced a severe attack of typhoid fever, during which he was found almost in a dying condition in his lonely garret, with nothing at hand except rejected manuscripts.

After his recovery his literary future became brighter, and he produced plays with astonishing rapidity—sometimes as many as four a year. These were chiefly comedies, characterized by wit, clever satire, rapid movement and easy dialogue. Among his early successes were *Candide* and *Fédora.* The character of Sardou's work did not increase the prestige of the stage, but his popularity secured for him election to the French Academy in 1878. His social satires include *Nos Intimes, Les Vieux Garçons, Ragabas, Le Roi Carotte* and *Divorçons;* his historical plays are *Patrie, La Sorcière, La Haine, La Tosca, Madame Sans-Gêne, Thermidor* and *Robespierre.*

SARGASSO, *sahr gas'o,* **SEA,** a tract of floating seaweed in the North Atlantic Ocean, covering an area greater than that of France. Its general boundaries are the 25th and 30th parallels (north latitude) and the 38th and 60th meridians (west longitude), but the position of the seaweed mass varies as it is moved by winds and currents. Columbus discovered the Sargasso Sea on his first voyage to the New World, and his ships were entangled in it for two weeks. Though the weeds are thickly matted together in some sections, a vessel could not become hopelessly involved in the tract because the patches are not continuous. It is believed by many authorities that the seaweed (see ALGAE) was originally carried by winds and currents from the Caribbean Sea and the Gulf of Mexico.

SAR'GENT, JOHN SINGER (1856-), a foremost American portraitist and eminent painter of landscape and figure pieces. He was born at Florence, Italy, of American parents, and in that city commenced his art studies. At the age of eighteen Sargent began studying with the French artist Carolus-Duran, of Paris, whose influence was permanent and beneficial. He exhibited in the Paris Salon regularly from 1878 to 1884, receiving in 1881 a second-class medal for his *Portrait of a Young Lady.* This painting was the subject of an appreciation by the novelist Henry James. In 1884 Sargent settled permanently in London, where his reputation as a portrait painter steadily advanced. Among the honors that came to him were the Grand Prize of the Paris expositions of 1889 and 1900, and the gold medal of the National Institute of Arts and Letters (American) in 1914.

Sargent has painted portraits of some of the most prominent men and women of his time, including Carolus Duran, Claude Monet, Edwin Booth, Lawrence Barrett, Joseph Jefferson, Ellen Terry as Lady Macbeth (exhibited in Chicago in 1893 at the World's Columbian Exposition), Theodore Roosevelt, John Hay and Dr. S. Weir Mitchell. Among figure pieces are his exquisite *Carnation Lily, Lily Rose,* representing two girls lighting Japanese lanterns in a flower garden; and *Carmencita,* a dancer in costume. Among the glories of the Boston Public Library are his splendid mural decorations, including the celebrated frieze of the *Hebrew Prophets.* Landscapes and figure pieces have constituted the bulk of his work since 1909, and his latest canvases include *The Weavers, The Courtyard, The Fountain* (Art Institute, Chicago) and *Trout Stream in the Tyrol.* In 1917 he was commissioned by the governors of the National Gallery of Ireland to paint for the institution a portrait of President Wilson.

SARNIA, *sahr'ni a,* a city in Ontario, the county town of Lambton County. It is at the mouth of the Saint Clair River, directly opposite Port Huron, Mich., with which it has connection by a car ferry and by a railway tunnel under the river. The Grand Trunk and the Pere Marquette enter Sarnia. By rail it is sixty miles northeast of Detroit, 169 miles southwest of Toronto and fifty-nine miles west of London. Population in 1911, 9,947; in 1921, 14,877, again of 47 per cent.

Sarnia has a large tonnage in lake traffic, being on the water highway between lakes Huron, Superior and Michigan on the west and lakes Erie and Ontario and the Saint Lawrence River on the east. It is also a large shipper of its own products, which include oil, lumber, salt, woodenware, stoves, thrashers and plumbers' supplies. The oil refinery, one of the largest in the Dominion, has about 1,400 regular employees. Of the city's buildings the courthouse and county buildings deserve special mention. Sarnia was incorporated as a city in 1904. Its name is the classical Latin for the island of Guernsey. T.D.

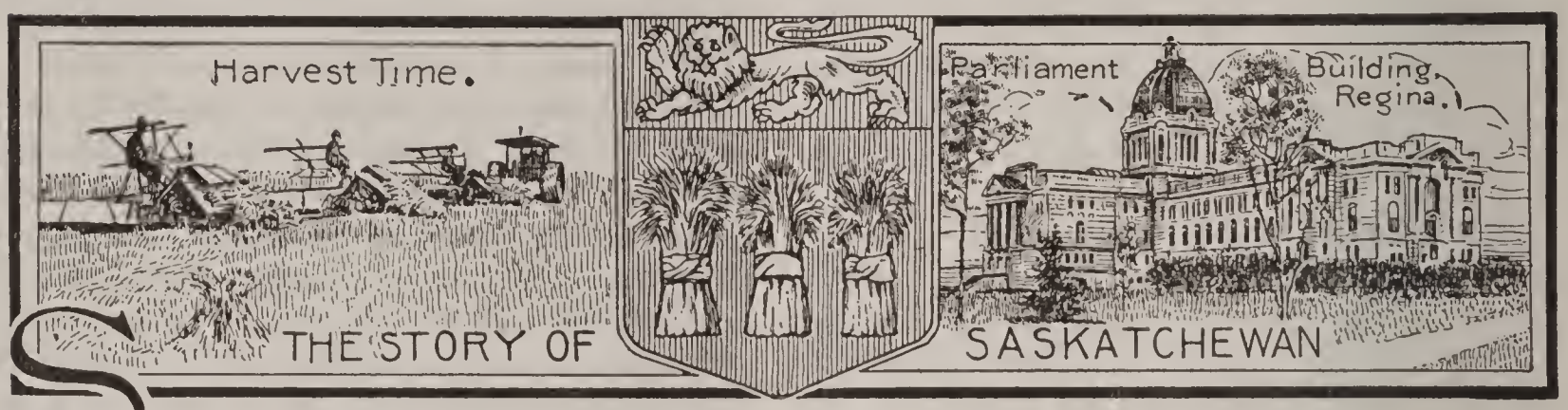
SARSAPARILLA, *sahr sa pa ril'a,* a drug somewhat widely used in "spring tonic" preparations. It is obtained from the dried roots of different species of smilax, found in Central and South America and Mexico. The roots are several feet long and about as large around as a goose quill. Modern physicians and chemists hold that the drug is inert, that is, has no curative properties, but its reputation gives it considerable commercial value. Lowell, Mass., is an important center for the manufacture of medical preparations of the drug. Sarsaparilla is used to some extent as a flavoring for ice cream soda.

SARTO, *sahr'toh,* ANDREA DEL (1487-1531), a great Italian master who holds a foremost place among the painters of Florence of the High Renaissance. He was one of the greatest colorists of his day; his style was dignified and his drawing masterly, and such was his knowledge of technique that he was known as the "Faultless Painter."

His real name was Andrea Vannucchi, but he was nicknamed Del Sarto, meaning "the tailor's son," because of his father's trade. He studied under several Florentine masters, and before he was thirty painted a series of seven

frescoes in the Santa Annunziata, the church of the Servites, at Florence. These paintings were followed by another notable series of frescoes, illustrating ten scenes from the life of John the Baptist. In 1519 he received a commission from Francis I of France to purchase works of art, but he squandered the money intrusted to him and was thenceforth forbidden to return to France. He spent the remainder of his life at Florence.

The most celebrated of his single pictures are the *Madonna del Sacco,* for the Servites; the *Last Supper,* in the refectory of the Convent of San Salvi, near Florence; and the *Madonna of the Harpies,* now in the Uffizi Gallery. The frescoes in the Santa Annunziata are his most celebrated. In addition, he painted many other Madonnas, Holy Families and similar subjects for altarpieces. His oil paintings are to be found in almost every gallery of Europe. Andrea del Sarto was the subject of Browning's famous poem, called by his name, which presents him in a sympathetic, and his wife in an unfavorable, light.



SASKATCHEWAN, *sas katch' e wahn,* a province of the Dominion of Canada, formed in 1905 from the eastern half of the District of Athabaska and the greater part of the districts of Saskatchewan and Assiniboia. It lies between Manitoba on the east and Alberta on the west. The United States extends along its southern border, and the North West Territories bound it on the north. The entire boundary is marked by meridians and parallels of even degrees, the eastern boundary being longitude 102°, the western, longitude 110°; the southern boundary is parallel 49°, and the northern, parallel 60°.

Area and Population. Saskatchewan extends along the border of the United States for a distance of 393 miles; its northern boundary has a length of 277 miles, and its length from north to south is 760 miles. The area is 251,700 square miles, of which 8,318 square miles are water. The province is smaller than Alberta by 3,585 square miles. It is a little larger than Colorado and Montana combined, more than twice the size of Great Britain and Ireland and larger than the German Empire by 40,000 square miles.

The People. The rapid growth of Saskatchewan is revealed by its increase in population. In 1901 the old district of Saskatchewan had 91,279 inhabitants; in 1911 the province had 492,432 inhabitants, an increase of 439.48 per cent, and the official census of 1921 placed the population at 757,510. In 1911 there were 1.95 inhabitants to the square mile; in 1921 this number had increased to about 3.14. However, the settled portion of the province is confined to the southern half, so the number of people to the square mile for the part of the province that is settled is greater than the above figures indicate. In 1921 218,958 people lived in cities and villages and 538,552 on farms; that is, the rural population was over two and one-half times the urban. The chief cities are Regina, Saskatoon, Moose Jaw and Prince Albert. Each is described in its place in these volumes.

About one-half of the inhabitants are British born, about one-fifth are immigrants from the United States, and the remainder are from various European countries, among whom Ruthenians, Poles and Germans are the most numerous.

LOCATION MAP
Showing location of Saskatchewan and the proportionate part of the Dominion it occupies.

Surface and Drainage. That part of the province lying between the Saskatchewan River and the United States boundary consists of open, rolling prairie and gently-rolling plain. The region is dotted here and there with clear lakes and clumps of trees, and there are occasional stretches

which are unbroken for long distances by slope or declivity, while, as far as the eye can reach, the view is not obstructed by a single tree. This region is broken in the east by a district north of the Qu'Appelle Valley, in which are located the Beaver Hills and Touchwood Hills.

North of Saskatoon and extending to the southern boundary of the great forest belt, which is approximately on a line drawn from the Swan River northwesterly to Prince Albert, is a large area of mixed prairie and woodland in which are located a number of government timber and game reserves. This is one of the most pleasing and fertile sections of the province. To the west of this region and south of the Saskatchewan River is a large, open area which is especially suited to ranching and growing wheat.

Much of the region between the Saskatchewan and Churchill rivers is a parklike country consisting of forests and open areas suitable for agricultural purposes. North of the Churchill the country is comparatively low and flat, with a light, sandy soil. Forests cover most of this region as far north as Lake Athabaska.

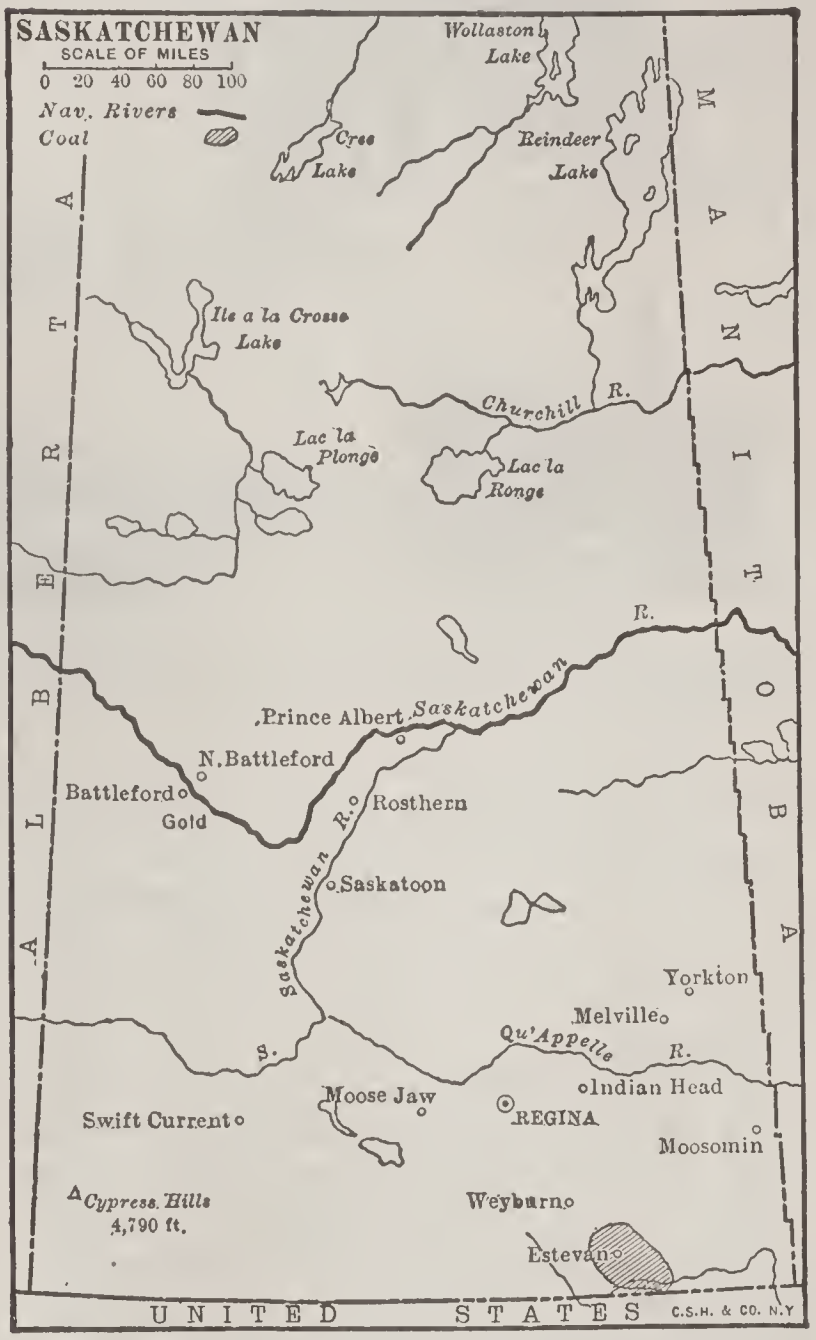
Rivers and Lakes. The southern part of the province is drained by the Saskatchewan, the Assiniboine, the Souris and their tributaries. The Churchill River flows across the central part and drains a chain of lakes of which Reindeer Lake is the largest. Each of these rivers is described under its title. The basin of the Churchill is separated from that of the Athabaska by a height of land that crosses the province in a northeasterly direction as far as Reindeer Lake, where it turns to the left and runs northward.

Big Quill Lake, east of Saskatoon, and Lake Johnson, in the south, are the only lakes of importance in the southern half of the province. In the valley of the Churchill and northward there are many lakes, the largest being Lake Athabaska, in the extreme northwest; Wollaston Lake and Reindeer Lake, in the northeast, and Lac la Ronge and Beaver Lake, near the central part of the province.

Climate. The winters are long and cold, but the atmosphere is dry and bracing, so a much lower temperature is endurable here than in a humid atmosphere. The southeastern corner of the province forms a remarkable exception to winter conditions elsewhere because of the influence of the Chinook winds which make the winters in that section very mild. See CHINOOK.

Plants and Animals. The open country in the park and prairie regions is covered with native grasses and wild flowers. The grasses make excellent hay. Between the Saskatchewan and the Churchill rivers are large forest areas. The poplar and the birch predominate on the highland, and fir, spruce and hemlock on the lower levels. North of the Churchill the forest consists almost wholly of cone-bearing trees.

Animals. In the forests are found the animals common to this northern latitude, the



OUTLINE MAP OF SASKATCHEWAN

On this map are shown the provincial boundaries, the chief cities, lakes and navigable rivers, coal deposits and the highest point of land in the province.

bear, the wolf, the mink, the otter, the fox, the skunk and the muskrat, all valuable for their fur. Since there is danger of some of these animals being exterminated by overhunting, the Saskatchewan government has enacted stringent game laws. Elk, moose and deer roam the forests in the north, and the pronged antelope is found in the rolling country in the southwest. In summer the lakes are frequented by thousands of waterfowl that

seek these secluded regions for nesting. The rivers and lakes abound in fish, and with the development of the country the fishing industry will become important. In 1920 the catch was valued at $296,472. Whitefish, pike, pickerel and trout, in the order named, yield the largest returns.

Minerals and Mining. There are large deposits of lignite near Estevan and along the Souris River in the southeastern part of the province, where several companies are carrying on mining operations. The Canadian Pacific Railway is operating coal mines near Wood Mountain, and deposits of coal have been discovered west of Saskatoon. Gold, silver and petroleum are known to exist in the province. Clay of good quality occurs around Estevan and in several other localities, and natural gas has been found at Swift Current. The value of the total mineral output runs close to $1,500,000 per year.

Agriculture. Saskatchewan is the leading province of the Dominion in the production of wheat and the second in the production of live stock. Both spring and winter wheat may be grown, but the spring varieties constitute by far the greater part of the crop. Both soil and climate are especially adapted to the production of this grain of the highest grade, and Saskatchewan wheat has won the first prize in a number of agricultural exhibitions in Canada and the United States. Other important grains are oats, barley and rye. Flax is also raised to a considerable extent. The leading grain crops for 1920, which was considered a representative year, were as follows, the figures representing bushels:

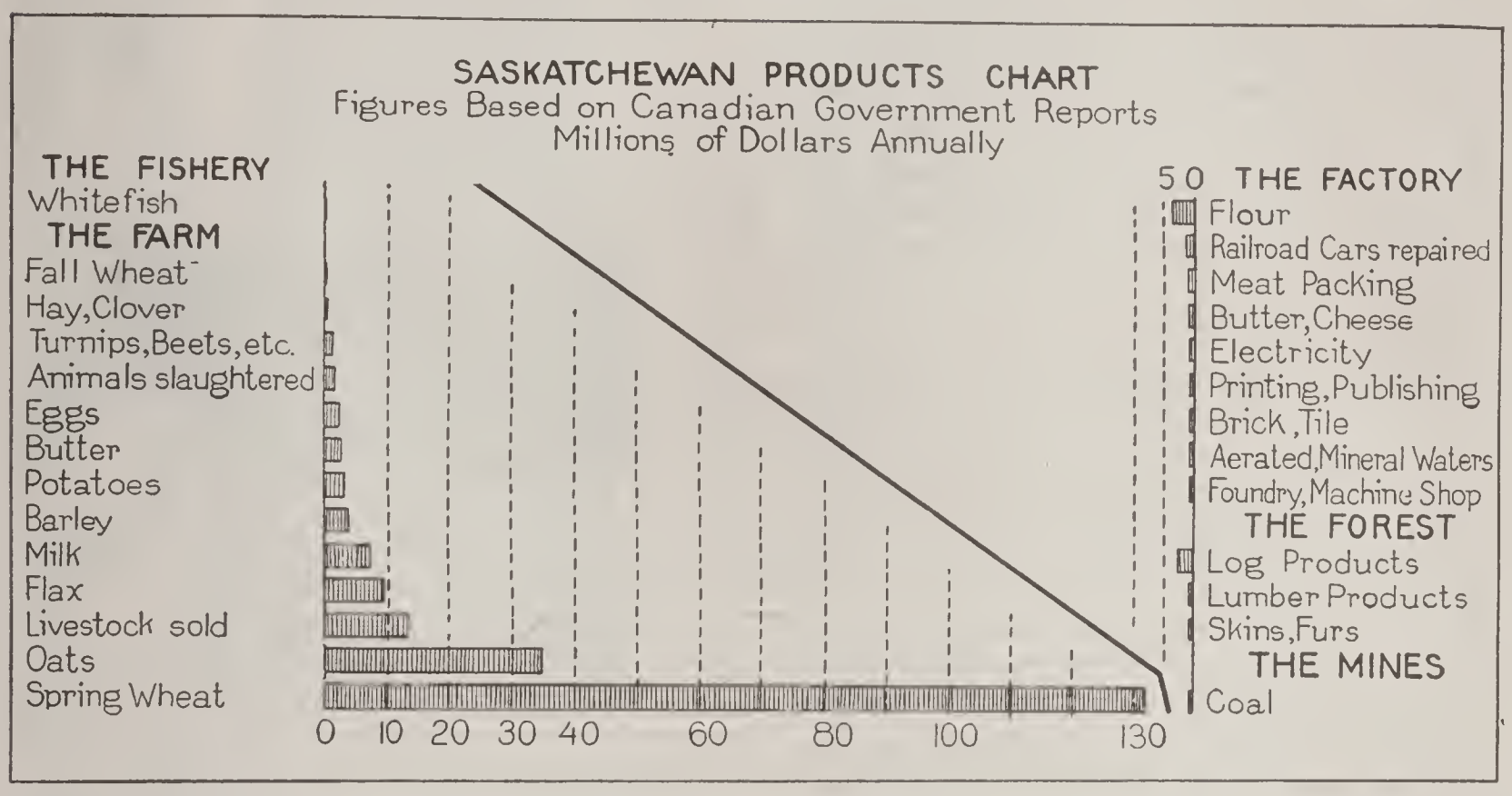
Wheat	113,135,000
Oats	141,549,000
Barley	10,502,000
Flaxseed	5,705,000

The crop sometimes falls from five per cent to twenty per cent below the above figures. Potatoes and root crops are successful throughout the province, and small fruits are grown. Hay, alfalfa and other forage crops are abundant and contribute largely to the success of the live-stock industry.

The southwestern section lies within the area affected by the Chinook winds, and is especially suited to raising horses and cattle, since stock can be pastured throughout the year. The park region between the Saskatchewan and Churchill rivers is destined to become a great

dairy region. Pure water, a cool climate and excellent pasturage all tend to the production of butter of the best quality. The estimated value of the dairy products is $25,000,000 every year; the dairy industry is rapidly growing. More than one-half the coöperative creameries are operated by the dairy branch of the Department of Agriculture, which also undertakes to market all the export butter of the province. Horses, beef cattle, sheep and swine are raised in large numbers, and the poultry industry is not inconsiderable.

The College of Agriculture at Saskatoon, besides maintaining an experimental farm, does extension work throughout the province, and offers scholarships to young people in the rural districts where there are government field agents. A "better-farming" train traverses the province yearly, and a special dairy car visits the dairy districts. Further instruction is given by lectures, bulletins and other pamphlets. Home-makers' clubs, with branches in all rural sections, contribute to the enrichment of rural life, and local agricultural societies, many of which receive government aid, all combine to make rural life pleasant, progressive and in every way worth while.



Manufactures. The value of the manufactured products increased from $651,667 in 1900 to $50,000,000 in 1918, a truly remarkable gain, but manufacturing is still comparatively undeveloped. The leading products are lumber, bricks and flour.

Transportation and Communication. Three great railway systems—the Canadian Pacific, the Canadian Northern and the Grand Trunk Pacific—traverse the province from east to west. Besides its main line, each system has numerous branch lines; the settled portion of the province is thus well supplied with railways. Regina and Moose Jaw in the south; Saskatoon in the central, and Battleford in the northern part of the settled portion are the most important railway centers. In 1921 the railway mileage was about 6,275 miles. Direct connections are maintained with British Columbia and the provinces east and with the United States. Saskatchewan has over 205,000 miles of telephone wire under government control, extending practically to every hamlet as well as to many farms.

Education. The school district is the unit for local education, and free public schools, upon which attendance is compulsory, are maintained throughout the province. The school system is in charge of the minister of education, who is a member of the executive council. The University of Saskatchewan at Saskatoon is at the head of the system, and provincial normal schools are maintained at Regina and Saskatoon. There are also a number of educational institutions of high order under control of the various religious denominations. Among these are the Saskatchewan Boys' College at Moose Jaw; the Presbyterian Theological College, affiliated with the University of Saskatchewan; Regina College (Methodist); University of Emmanuel College and Saint Chad's College (Anglican).

The public schools are supported by a provincial fund and by local taxes. The affairs of each district are managed by a local board.

The teaching of a foreign language one hour a day is allowed in districts having foreign population.

Government. The lieutenant-governor, appointed by the Governor-General of Canada, is the chief executive officer of the province. He is assisted by an executive council of seven members, each of whom is the head of a department of the provincial government. The premier is the head of the council. The legislative department consists of an assembly of fifty-four members. Saskatchewan sends sixteen members to the House of Commons at Ottawa, and is represented by four members in the Dominion Senate. The judicial system comprises the supreme court and district courts.

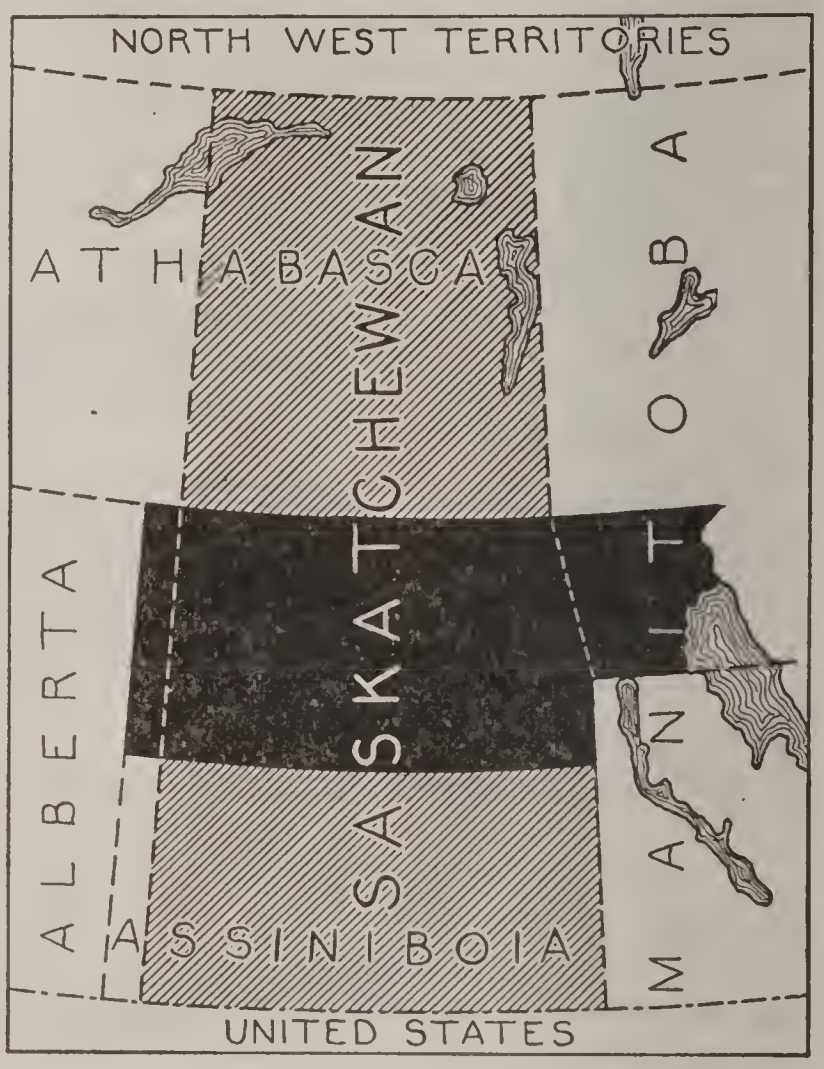
A unique feature of local government is found in the Saskatchewan local government board, consisting of three members. The board deals with separate school board appeals and assessment appeals, but its most important duty consists in passing upon all proposed municipal loans before they can be authorized.

History. Saskatchewan was a part of the vast territory which, under the name of Rupert's Land, was controlled by the Hudson's Bay Company. Long before there was any attempt to found settlements in the country north and west of the Great Lakes, this company had established trading stations around Hudson Bay and far inland to the south and west. In 1817, a permanent settlement was founded in the valley of the Red River under the direction of the Earl of Selkirk, who had obtained a controlling interest in the Hudson's Bay Company. This settlement, which was in the present province of Manitoba, constituted the beginning of the political organization of the great Canadian Northwest. Soon after the organization of the Dominion of Canada, in 1867, measures were taken to secure control of the Hudson's Bay Company's rights, and these rights were purchased in 1869 for $1,500,000.

The entire region north and west of the provinces of Ontario and Quebec became known as the North West Territories and was divided for the purpose of administration into a number of districts. In 1870 the province of Manitoba was organized. With the completion of the Canadian Pacific Railway in 1885 immigration began to flow into the vast fertile region north of the United States. With the increase of population came an increasing demand for responsible local government, and in 1905 the provinces of Alberta and Saskatchewan were organized from the districts of Alberta, Athabaska, Saskatchewan and Assiniboia; Saskatchewan being formed of Assiniboia, Saskatchewan and the eastern part of Athabaska.

A local rebellion occurred after the opening of the country to settlement, headed by Louis Riel. It is described under the title Saskatchewan Rebellion.

The province was organized in 1905 with Hon. Amédée Forget as the first lieutenant-



FORMATION OF THE PROVINCE

The area in solid black was Saskatchewan before the organization of the present province. The dotted lines through the black area show the parts of the old province which were given to Alberta and Manitoba. To the north and south the shaded areas are the parts of former Athabasca and Assiniboia which were included in the new province.

governor. Hon. Walter Scott was chosen premier, and he continued at the head of the government for more than ten years. The organization of the province was followed by a rapid increase of settlers, and the first decade of Saskatchewan's existence as a province was characterized by unusual growth in wealth and population.

The assembly has shown foresight and liberality in the enactment of laws for promoting agricultural, industrial and educational interests. In 1920 the province, by 31,692 majority, adopted a stringent prohibition law. Liquor cannot be carried into the province. The province made large contributions of men, money and supplies to the allies in the war.

RESEARCH QUESTIONS ON SASKATCHEWAN

(An Outine suitable for Saskatchewan will be found with the article "Province.")

How can you tell whether the Saskatchewan River was named for the province or the province for the river?

In what very important agricultural product does Saskatchewan rank first among the provinces of Canada?

What proves the unusual excellence of this product?

What is there curious and interesting about the boundary lines of this province?

How can it be, since the eastern and western boundaries are meridians, that the northern boundary is so much shorter than the southern?

How does the greatest altitude of this province compare with those of the provinces which bound it to the east and west? With those of the states of the American Union upon which it borders?

What state of the United States does this province most closely resemble in area? (See list in article UNITED STATES.) What country of Europe? (See table facing page 2092.)

How do these political units which it resembles in size compare with it in population?

What stand did Saskatchewan take on the liquor question during the War of the Nations?

Why are the winters in the southeastern section warmer than winters elsewhere in the same latitude?

How does the province compare in density of population with the Dominion as a whole? With the provinces to either side of it?

Is Saskatchewan largely a "city" province or a "country" province—that is, do the majority of the people live in towns or under rural conditions?

In what way does the southern part of the province resemble in its surface features Illinois or Iowa?

What large lake lies partly in Saskatchewan and partly in Alberta? How large is it? How many lakes in Canada have a greater area?

What are the most favorable features of the climate? What is the most unfavorable, from the point of view of the farmer?

Why have strict game preservation laws been necessary?

What animal which used to be plentiful in the southern part of the province is no longer to be seen?

What advantages has the southwestern section which fit it especially for the raising of cattle and the making of butter?

How does the government help the farmers to dispose of their butter?

What "extension" work does the College of Agriculture do to help the farmers in their homes?

Who was Louis Riel? What part did he play in the history of the province and in that of Canada as a whole?

What is the railroad mileage of the province to each hundred square miles of area? How does it compare in this respect with the provinces and states upon which it borders? With Canada as a whole?

Why was this region first entered by the white men? When was the first permanent settlement made in this western region? Was that settlement within the present limits of Saskatchewan?

Other Items of Interest. The name Saskatchewan is a Cree Indian word meaning "rapid river." It thus belonged to the river before it did to the district or province.

The highest altitude in the province is reached in the Cypress Hills, where a peak rises to a height of 4,790 feet.

One of the terrors of the Saskatchewan farmer is the occasional hailstorm which leaves his growing crops beaten into the ground. To meet this possible loss, which amounts in some seasons to $2,000,000, a hail tax is levied and the farmers are insured against hail.

There are in the province over 11,000 Indians, mostly Crees. All the Indians live on government reservations, and these reservations are for the most part self-supporting. Many of the Indians are excellent farmers, trained for their work in the industrial schools of the province.

Saskatchewan has about 8,700 Dukhobors, members of a curious religious sect from Russia whose doctrines somewhat resemble those of the Quakers.

The valley of the Saskatchewan was one of the chief centers of the activities of the fur traders, and over the open plains south of the river great herds of buffalo roamed. E.H.O.

Consult Boam and Brown's *The Prairie Provinces of Canada;* Black's *History of Saskatchewan.*

Related Subjects. The reader who is interested in Saskatchewan will find material of value in the following articles in these volumes:

CITIES AND TOWNS

Arcola	Moosomin
Assiniboia	North Battleford
Battleford	Prince Albert
Canora	Regina
Estevan	Rosthern
Humboldt	Saskatoon
Indian Head	Shaunavon
Maple Creek	Swift Current
Melfort	Weyburn
Melville	Wolseley
Moose Jaw	Yorkton

HISTORY

Hudson's Bay Company	Riel, Louis
Red River Rebellion	Saskatchewan Rebellion

PRODUCTS AND INDUSTRIES

Butter	Oats
Dairying	Wheat
Lumber	

WATERS

Assiniboine River	Churchill River
Athabaska, subhead *Athabaska Lake*	Saskatchewan River

SASKATCHEWAN, UNIVERSITY OF, an institution founded in 1907 at Saskatoon, by act of the provincial legislature. The university campus, containing 1,333 acres, lies along the Saskatchewan River. The institution is organized into colleges of arts, science and agriculture. Special emphasis is placed on the work in the college of agriculture, especially the short courses, and this department coöperates closely with the Saskatchewan department of agriculture in the direction of institute meetings and home-making clubs. In 1912, when the university held its first commencement, there was a student enrolment of 160. There are now about 450 students and forty instructors, and the library contains 20,000 volumes.

SASKATCHEWAN REBELLION, *sas katch' e wahn re bel' yun,* a rising of the half-breeds in Canada in 1885 under the leadership of Louis Riel. Shortly after the collapse of the Red River Rebellion (which see) the Canadian government granted to each of the métis or half-breeds 240 acres of land. For a time this generosity seemed to have solved a difficult problem, but as Manitoba began to fill with settlers many moved westward and settled on the banks of the Saskatchewan River. There they were again disturbed by the advance of the settlements, and particularly by the construction of the Canadian Pacific Railway. The Indians and half-breeds resented, first, the threatened extinction of the buffalo herds, on which they depended for food. They also feared that their lands, to which they had no patents or titles, would be taken from them, and they were dissatisfied with the government's method of surveying, which eliminated the old French system of having all farms front on the river.

RIEL REBELLION MEDAL

North West Canada medal granted to all who served in the rebellion. The word Saskatchewan appeared only on the medals of those who were present at the actions of Fish Creek, Batoche and Frenchman's Butte. The reverse side contains the head of Queen Victoria and the words, *Victoria regina et imperatrix.*

With these difficulties ahead of them, the métis, in 1884, called on Louis Riel, who was then in Montana, to help them maintain their rights. In the following March Riel was elected president of the provisional government which the métis established at Saint Laurent. At first Riel was moderate, and there was hope that the government would eventually make the wanted concessions. Before the government could make up its mind, an unfortunate encounter took place at Duck Lake between some of the Mounted Police and a band of métis. This skirmish was followed by a rising of the Cree Indians, who, led by Big Bear, attacked a little settlement at Frog Lake. The men were killed, and the women and children carried away. The news of the outbreak caused great excitement in Eastern Canada. A force of 4,400 men was hastily collected, and in two months time were in the field and ready for combat.

The commander of the government's forces was General Middleton, who divided his army into three units or columns. The first, under General Middleton, was to advance from Qu'-Appelle to Batoche; the second, under Colonel William D. Otter, was to advance from Swift Current to Battleford; and the third, under General Strange, was to march from Calgary to Edmonton. All three columns were to use the Canadian Pacific Railway as the base of operations. All three of the columns were successful. General Middleton's column defeated Riel's force at Fish Creek, near Batoche, and three days later took Riel prisoner. Big Bear's forces were broken by a special flying column under Major S. B. Steele, and Poundmaker, the other Cree chief, surrendered at Battleford. Riel was tried at Regina, and was hanged for treason. A number of the other leaders were executed, and a few, including Poundmaker, were imprisoned.

Results of the Rebellion. Although insignificant from a military point of view, the rebellion had important results. It led the Dominion government to recognize the claims of the métis, and to give them deeds to their lands. The North West Territories, in view of their increasing importance, were given representation in Parliament. But the most important effect was that it brought home to all Canadians the reality of Confederation and stimulated national feeling. W.F.Z.

SASKATCHEWAN, *sas katch'e wan,* **RIVER,** a Canadian stream which forms, together with the Nelson River, the greatest river system flowing into Hudson Bay. The Saskatchewan-Nelson is one of the four great river systems east of the continental divide of North America; the other three are the Mississippi, the Saint Lawrence and the Mackenzie. The Saskatchewan has a length of 1,205 miles from its mouth to the source of its chief tributary, the Bow. The area which this system drains includes 158,800 square miles, an area more than one and one-half times as large as that of the Great Lakes and seven times as large as that of Nova Scotia. The combined Saskatchewan-Nelson has a drainage basin of 370,800 square miles, or one-tenth of the total area of the Dominion of Canada. See map, facing page 1096.

The Saskatchewan is formed by the junction of two branches, the North and South Saskatchewan, which unite about twenty-five miles east of Prince Albert, in the province of Saskatchewan. The Saskatchewan proper is 240 miles long, and flows east to the northwest corner of Lake Winnipeg. Shortly before entering Lake Winnipeg, the river flows through several lakes, the largest of which is Cedar Lake, thirty miles long. Below Cedar Lake navigation is interrupted by rapids, but west of the lake the river is navigable for large steamers as far as the junction of the north and south branches. Smaller, shallow-draught vessels ascend the North Saskatchewan as far as Edmonton, nearly 500 miles farther. The river is narrow and rapid throughout most of its course. "Saskatchewan," in fact, is a Cree Indian word meaning "rapid-flowing river."

The North Saskatchewan has its rise in the glaciers on Mount Hooker, in the Rocky Mountains of Alberta. Flowing eastward across Alberta, it skirts the southern border of the northern coniferous forests, and meets the south branch slightly more than halfway across Saskatchewan. The North Saskatchewan is about 760 miles long, and drains an area of 54,700 square miles.

The South Saskatchewan, which is usually regarded as the main stream, has several head streams, of which the Bow is perhaps the most important. The Bow rises in the foothills of the Rockies west of Calgary, and after an east-southeast course of 315 miles unites with the Belly River, which comes from the southwest corner of Alberta, to form the South Saskatchewan. Some of the head streams of the South Saskatchewan rise in Northern Montana. The South Saskatchewan is 865 miles long to the head of the Bow, and has a drainage basin of

65,500 square miles. The waters of this stream are less important for navigation than those of the north branch, but are of untold value for irrigation (see the article ALBERTA, subhead *Irrigation*). W.F.Z.

SASKATOON', a city in Saskatchewan, in the central part of the province. It is situated on the South Saskatchewan River, on the main line of the Grand Trunk Pacific, and on branches of the Canadian Pacific and Canadian Northern railways. It is 311 miles by the shortest route southeast of Edmonton, 160 miles northwest of Regina, 400 miles northeast of Calgary and 467 miles northwest of Winnipeg. The city takes its name from a small shrub and its berry, called *saskatoon* by the Blackfoot Indians and also known as service berry or June berry. Saskatoon was founded in 1890, but as late as 1901 was merely a village of a hundred people. It was incorporated as a city in 1906, and adopted commission government in 1910. Population, 1911 Dominion census, 12,004; 1911 civic census, 18,096; in 1916, estimated, 25,000.

Saskatoon is one of the most important cities in the Canadian West. It is at once a railway center and a commercial and manufacturing center of the first rank. It has over 200 wholesale houses and numerous retail establishments. It is a large shipper of wheat, and has one of the great interior elevators (capacity 3,500,000 bushels) erected by the Dominion government. One of its largest manufacturing establishments is the mill of the Quaker Oats Company; this has a daily capacity of 1,200 barrels of flour and 350 barrels of oats. Ironworking and the manufacture of bedding and garments are other important industries. The city owns and operates all its public utilities, including waterworks, electric light and power system, and electric street railway.

Saskatoon is the seat of the University of Saskatchewan (which see), and also has a provincial normal school (established in 1912), a collegiate institute, Presbyterian College (established in 1912 and opened in 1914) and Emmanuel College, an Anglican theological school. Emmanuel College was founded at Prince Albert in 1879, but was removed to Saskatoon in 1909. In addition to the splendid buildings of these institutions special mention must also be made of the post office, erected in 1908 at a cost of $50,000, the many large public schools, four of which cost $150,000 each, and the Canada building, completed in 1913 at a cost of $600,000. Saskatoon is the seat of a judicial district, and has a Dominion land office and land-titles office. A.MC G.Y.

SASSAFRAS, *sas'a fras,* a tree of the laurel family whose aromatic bark yields an oil used in flavoring medicine. Drug stores sometimes sell the bark itself to people who wish to make the spring tonic known as "sassafras tea." A sticky substance, obtained from the leaves and twigs, is used in the Southern United States to flavor gumbo soups. The tree is found from Southern Vermont to Florida and Texas, and west as far as Kansas. It is usually from thirty

SASSAFRAS LEAVES
Showing variations in form.

to fifty feet high, though along roadsides it often grows merely as a shrub. In autumn the tree is strikingly beautiful, because of its rich gold and scarlet foliage. The leaves are of three different shapes, ovate, two-lobed and three-lobed, and all three kinds are found on one twig. The flowers are yellow and the fruit a dark blue berry. Sassafras wood is strong and light and is used in making posts and rails.

SATELLITE, *sat'e lite,* a word derived from the Latin *satelles,* meaning *an attendant.* In astronomy the term is used to describe a celestial body revolving around a planet. The moon is a satellite of the earth; it revolves round the earth and attends or follows the earth in its journey round the sun. Saturn, Jupiter, Mars, Uranus and other planets also have satellites which revolve round them as the moon revolves round the earth. In the case of the moon it is considered that this satellite was formerly a part of the earth, being thrown off into space and held there by the attraction of the sun and the earth; the same theory (nebular hypothesis) accounts for the formation of the other satellites.

Related Subjects. For further information on the general subject see the following articles in these volumes:

Astronomy	Nebular Hypothesis
Eclipse	Planet
Jupiter	Saturn
Moon	Star

SAT'IN, a glossy, silken fabric, which is woven in such a way that the threads of the weft are almost all hidden by the warp, thus presenting a more unbroken surface. Satin has a peculiar gleam which no other fabric possesses; its smooth surface reflects rays of light almost like a mirror. Satin is made plain, damasked, open-worked, striped or embroidered. As a material for women's dresses satin is not used as much as formerly, its place being taken to a large extent by lighter materials. The chief centers of satin manufacture are Lyons, Genoa and Florence, although large quantities are now made in Great Britain and the United States. The term satin is properly applied only to silk goods; woolen, linen and cotton imitations are usually known as *sateens.*

SAT'IRE, the name given by the Romans to a type of poem in which men and manners were held up to ridicule, often of the most scathing sort. With some poets the object of the ridicule was to better the conditions which they satirized; with others mere bitterness underlay the writing. Lucilius was the originator of the form, and Juvenal its most famous master. His biting comments on the vicious life of Rome have been imitated by a number of later poets. Dryden's *Absalom and Achitophel* and *MacFlecknoe,* Johnson's *London* and Pope's *Dunciad* are among the great satirical poems in English, while Swift's *Gulliver's Travels,* in prose, is one of the greatest satires in any language. In the United States, Lowell, Holmes and Mark Twain made much use of satire in their writings, but with them it had not the fierceness which often distinguished it in classic times. Haliburton is the foremost Canadian satirist.

SATOLLI, *sah toh'le,* FRANCESCO (1839-1910), a Roman Catholic prelate, born at Perugia, Italy, and educated in that city. For a time he taught theology at Urban College of the Propaganda, and in 1889 was created archbishop of Lepanto. In that same year he was sent to the United States as papal representative at the centenary celebration of the establishment of the Roman Catholic hierarchy in the United States, and in 1893 returned to the same country as first apostolic delegate. Created cardinal in 1896, he returned to Rome in the same year. When Pope Leo died in 1903, many believed that Cardinal Satolli would be elected to succeed him, but the choice of the sacred college fell upon Giuseppe Sarto (Pius X).

SATURDAY, *sat'ur da,* the seventh day of the week, the day of the Roman god Saturn. This is the only day named for a Roman deity; all the others have Anglo-Saxon names. Saturday is the Sabbath day among the orthodox Jews. Many states have made Saturday afternoon a legal holiday, and it is a growing custom for employers in other states to give their workmen a half holiday. A further advance is the step taken in 1914 by a number of prominent department stores in New York City, whereby the stores remain closed all day Saturday, as well as Sunday, and the employees are given two holidays each week.

SAT'URN, the sixth planet in distance from the sun, and next to Jupiter in size. It was known to the ancients and marked their boundary of the solar system, beyond which they knew of no stars or planets. Little is definitely known about Saturn. Its average distance from the sun is 886,000,000 miles, but that distance varies 100,000,000 miles over and above the average, on account of the variation in the planet's orbit. Saturn rotates on its axis in 10 hours, 14 minutes, and revolves round the sun in twenty-nine and one-half years. Its surface is about ninety times that of the earth, its volume 770 times, its mass ninety-five times; but its density is only one-eighth the earth's density, or less than that of water.

Saturn appears as a big, yellow star, outshining all others with the exception of Sirius. The planet has ten satellites and is surrounded by a system of rings such as do not exist anywhere else in the solar system. It is best observed in late summer or early autumn, in the eastern or southeastern sky, moving southward as the evening advances.

Saturn's Rings. The ring system of Saturn has been the object of much speculation and study, but the use of modern instruments has enabled astronomers to determine what the rings really are. In 1610 Galileo, working with a telescope that would be despised in any modern observatory, was puzzled to notice a peculiarity on the surface of Saturn for which he could not account. In 1665 Huyghens explained the mystery of Saturn's ring, believing only one to be present. Now, however, it is known that the planet is surrounded by three concentric rings. These rings are composed of myriads of separate meteoric particles, each

particle moving in its own orbit round the planet, the whole producing the effect of a gauzelike ring, resembling particles of dust in a ray of sunlight. The outer and larger ring has a diameter of 173,000 miles and a thickness of probably 100 miles.

Saturn's Satellites. The system of which Saturn is the center is enormous. The largest of the ten satellites, Titan, was discovered by Huyghens in 1665. It is not visible to the naked eye, but can easily be found with the aid of a small telescope. Its distance from Saturn is 770,000 miles, and it has a diameter of 3,000 or 4,000 miles, its mass being about double that of our moon. Another of the satellites, Iapetus, is 2,225,000 miles from the planet and revolves round it in seventy-nine days. The tenth and smallest of the satellites was discovered in 1905. F.ST.A.

THE PLANET SATURN

At left, as seen through a small telescope. At right, the rings, seen edgewise, appear as a thin, luminous line crossing the globe of the planet.

Related Subjects. For illustration of comparative sizes of Saturn and the other planets and their distances from the sun, see PLANET. Other articles to which reference is suggested are the following:

Astronomy	Solar System
Nebular Hypothesis	Star

SAT'URN, in classical mythology, the youngest of the Titans and son of Uranus and Gaea. He overthrew his father and became ruler of the universe and was happy until the birth of his first child. Then he remembered that an oracle had declared that he should be dethroned by his child, and to prevent this he swallowed the babe. Four other children met a like fate, but when Jupiter, the sixth and last, was born, the mother concealed the babe and gave Saturn in its stead a stone, wrapped in child's clothing, which he swallowed without noticing the substitution. When Jupiter grew up he dethroned his father and banished him to Italy, where he set up a most prosperous kingdom. He taught the people agriculture and useful arts, and his reign in Italy was known as the Golden Age. Saturn is shown in art as an old man bent with infirmities. In his hand he holds a scythe and a serpent which bites its own tail—emblems of time and of the year. Saturn himself is the personification of time, and the story of his swallowing his children is but an allegorical way of saying that time creates only to destroy.

SATURNALIA, *sat ur na' li a,* an ancient Roman festival in honor of Saturn, the god who presided over the sowing of the seed. The festival began on December 17 and lasted under the Caesars for seven days. The first day was devoted to public religious rites, and sacrifices were offered to Saturn; the usual family sacrifice was a young pig. The festival was entirely one of mirth, the schools observed holidays, the courts of law were closed, and banquets and family gatherings were held. The Saturnalian festivals were participated in by the slaves, who were considered free for the time, and waited on by their masters. The last days of the festival were devoted to visiting and giving presents. Little clay images were the principal gifts. They were called *sigillaria,* and from the custom of giving these, the last days of the festival were called the *sigillaria.*

SATYR, *sat' er,* or *sa' ter,* in Greek mythology, a god of the woods, who had a man's head and hairy body, but the ears, legs and feet of a goat. Satyrs are associated with the worship of Bacchus, and appear in the chorus of the dramas acted at the Bacchic festivals. Pan was the chief of the satyrs.

Related Subjects. The reader is referred to the following articles in these volumes:

Fauns	Pan
Mythology	Silenus

SAUGUS, *saw'gus,* MASS., a town in Essex County, eight miles north of Boston and four miles west of Lynn, of which it was a part until its separate incorporation in 1815. It is on the Saugus River, an extension of Lynn Harbor, and is served by the Boston & Maine Railroad and electric interurban lines. The town has a public library. Its chief industrial establishments are woolen mills and manufactories of spices, brick, leather, rubber goods and iron-foundry products. The area of Saugus is about eleven square miles, and within the corporate limits are the villages of East Saugus and Cliftondale. In 1910 the population was 8,047; it was 10,874 in 1920.

SAUL, *sawl,* the first king of Israel, who ruled in the eleventh century B. C. He followed Samuel, the last of the judges. Having gathered together the armies of Israel, Saul, aided by his son Jonathan, waged successful war against encroaching tribes, especially the Philistines. The story of Saul, as told in *I Samuel,* is one of the most tragic of Bible history. At first appearing as a man of heroic stature and modest manner, he soon began to show an erratic temper and uncontrolled self-will. This developed into a kind of jealous madness, dangerous alike to enemies and friends. The youthful David, who was engaged to play day by day upon the harp to quiet his ravings, became the object of his bitterest persecutions. So darkened did his mind finally become, that, on the last night of his life, he went disguised to the Witch of Endor to ask the outcome of the next day's battle. It proved to be death to Saul and his sons, and the hunted David returned to reassemble the scattered armies, avenge the king's death and succeed him.

David's noble lament for Saul, his king, and Jonathan, his friend, contains the words:

Saul and Jonathan were lovely and pleasant in their lives,
And in their death they were not divided;
They were swifter than eagles,
They were stronger than lions.
. . . . . .
How are the mighty fallen in the midst of the battles!

SAULT SAINTE MARIE, *soo saint ma'ri,* a city in Ontario, on the Saint Mary's River, directly opposite the city of the same name in Michigan. The Canadian city is on the Canadian Pacific and the Algoma Central & Hudson Bay railways. The latter runs from the Sault to the National Transcontinental Railway, and also connects with the Canadian Northern, the Duluth, South Shore & Atlantic, and the Minneapolis, Saint Paul & Sault Sainte Marie (Soo Line) railways. By rail Sault Sainte Marie is 618 miles west of Montreal, and by water it is about 870 miles from Montreal, 237 miles from Fort William and Port Arthur, and 342 miles from Duluth. Population in 1911, 10,984; in 1921, 21,092, a gain of 93 per cent.

Sault Sainte Marie is the capital of the Algoma district of Ontario. It has a large water commerce, chiefly in grain and iron ore passing to the East and coal passing to the West. Navigation around the "Sault," or rapids, is facilitated by the various Sault Sainte Marie Canals (which see). The city is one of Ontario's manufacturing centers, the capital invested in manufacturing being about $70,000,000. Steel, rails, coke, pulp and paper, tar, chemicals and lumber in all forms are the leading products. The output of a single large pulp and paper mill is valued at $5,000,000 a year, and the employees number about 2,000. About 6,000 men are in mills of the Algoma Steel Corporation. Nearly a million tons each of ore and coal are handled on the docks of this city.

The city owns (since 1914) its water and lighting systems. There are numerous imposing public buildings, among them the post office and customhouse, built in 1905, the Algoma Central Railway station, the Y. M. C. A. building and Kings Theater. There is also a general public hospital. Sault Sainte Marie was settled about 1850, and was incorporated as a city in 1912. C.W.MC C.

SAULT SAINTE MARIE, MICH. (pronounced *soo saint ma'ri* and popularly called "The Soo"), the county seat of Chippewa County, is situated along Saint Mary's River, in the northeastern corner of the Upper Peninsula, 150 miles east of Marquette and opposite an Ontario city of the same name. It is served by the Canadian Pacific, the Duluth, South Shore & Atlantic and the Minneapolis, Saint Paul & Sault Sainte Marie railroads. In 1910 the population was 12,615; it was 12,096, a slight decrease, in 1920. The area exceeds fourteen square miles.

The chief point of interest in the city is the famous ship canal whose great locks permit the passage of vessels from the Saint Mary's River to Lake Superior, navigation being otherwise interrupted by the rapids in the stream (see SAULT SAINTE MARIE CANALS). The river is here spanned by an international bridge one mile in length. Prominent features of the city are a Federal building, Carnegie Library, a $175,000 high school building, a railroad hos-

pital, the city armory, Fort Brady and the United States Government Park (150 acres) along the river. "The Soo" is a favorite summer resort, since the summers are delightfully cool. Electrical energy, obtained from the river, is used to operate large paper and lumber mills, one of the largest carbide plants in the United States, flour and woolen mills, a leather factory with an annual output worth $300,000, and dredging-machinery works. The city also has important fish-packing interests.

Could the history of the Indians of the North be written, the site of Sault Sainte Marie would doubtless have an important place in that record. It was visited by the French missionaries Rambault and Jogues in 1641, and in 1662 Pere Marquette established there the first permanent settlement within the present limits of Michigan. At the great congress of Indian nations assembled there in 1671, the French, by proclamation, assumed possession of the territory between that point and the Gulf of Mexico and westward to the Pacific Ocean. The town was incorporated in 1879 and became a city in 1887. C.E.C.

SAULT SAINTE MARIE CANALS, popularly called the Soo Canals, two artificial waterways, one in Michigan and one in Ontario, by which vessels pass between lakes Superior and Huron. The construction of the canals was

SAULT SAINTE MARIE CANALS

(1) American canal and locks; (2) Canadian canal and locks; (3) power canal; (4) Sault Ste. Marie, Michigan; (5) Sault Ste. Marie, Ontario.

made necessary by the rapids of the Saint Mary's River, which forms the natural connection between the two lakes. These canals carry more tonnage each year than the Suez, Manchester, Kiel or Kaiser Wilhelm and New York State Barge canals combined. In 1916 the number of ships passed through the locks was 25,407, bearing a total of 54,922 passengers and 91,999,219 tons. The previous high record in tonnage, 79,718,000, was carried in 1913. Iron ore comprises eighty per cent of the east-bound freight, and coal ninety per cent of the west-bound.

The Canadian Canal. The early trappers had to carry their canoes and furs around the rapids, but in 1798 the Northwest Fur Company completed a canal through which canoes and bateaux could ascend the river. This canal had a single lock, which was thirty-eight feet long and eight feet nine inches wide and had a lift of nine feet. It was destroyed by American soldiers in 1814. The present Canadian canal was begun in 1888, and was completed in 1895 at a total cost of $4,994,373. The Canadian canal is 7,067 feet, or one and one-third miles long between the ends of the entrance piers, 150 feet wide at the surface and twenty-three feet deep. The lock is 900 feet long by sixty feet wide, and has a lift of eighteen feet. The canal is cut through Saint Mary's Island, on the north side of Saint Mary's River. The tonnage of freight carried through the Canadian Canal averages 30,000,000 a year; the record tonnage, 42,699,394, was carried in 1913.

The American Canal. On the United States side there was at first a tramway for the conveyance of freight and passengers around the rapids. The first canal was completed in 1855 by the state of Michigan, which retained the ownership until 1881, when it was transferred to the United States government. This canal had two masonry locks, each 350 feet long and with a lift of nine feet. These locks were destroyed in 1888 by the excavation for the Poe lock.

The oldest of the present locks is the Weitzel lock, completed in 1881 under the direction of General Godfrey Weitzel (1835-1884). The Weitzel lock is 515 feet long and has seventeen feet of water on the sills. The Poe lock, just north of the Weitzel lock, was completed in 1896 and was named for General Orlando M. Poe (1832-1895), the army engineer in charge of construction. This lock is 800 feet long, and has twenty-two feet of water on the sills. The Weitzel Lock cost $1,000,000 and the Poe Lock cost $3,000,000. While the Poe Lock was under construction the Canadian government completed the canal described above. For many years the Canadian canal, being slightly deeper, was used by the barge vessels, although the total tonnage of freight was divided fairly evenly between the two canals.

In 1909 the United States government began the widening of the old canal channel from 108 to 230 feet and the construction of the Davis Lock, or Lock No. 3. During 1914 a new canal

was excavated to the Davis Lock, and the lock and canal were opened in October. The Davis Lock is 1,350 feet long between the inner gates, is eighty feet wide, and has a minimum depth of 24¼ feet on the sills. The new canal to this lock is 260 feet to 300 feet wide. The increased depth of the Davis Lock permits the largest lake steamers to use the American canal, and the lock is large enough to hold two of them at one operation. The lock can be filled or emptied in six minutes. The construction of the Davis Lock and the new canal involved an expenditure of $5,000,000; the widening and deepening of the old canal cost $4,400,000, and improvements of the channel in the river cost $9,400,000. In 1912 Congress authorized the construction of a fourth lock, directly north of and exactly similar to the Davis Lock. The excavation for Lock No. 4 was completed in 1914, and the lock will probably be completed in 1917 or 1918. C.E.C.

Related Subjects. The general article CANAL should be read in connection with this article. A list of American and Canadian canals is there given. Valuable collateral information is also contained in the articles:

Erie Canal
New York State Barge Canal
Panama Canal
Suez Canal

SAUNDERS, *sahn'derz,* MARGARET MARSHALL (1861-), a Canadian author of animal stories. *Beautiful Joe,* her best known book, has been translated into German, Swedish, Bulgarian, Chinese and other foreign languages and has reached a circulation of more than 500,000 copies. This book won a prize offered in 1894 by the American Humane Educational Society, and then journeyed for six months from publisher to publisher before one was found who was willing to risk publishing it. To-day there are millions of children and men and women, who have read this classic among animal stories. Among Miss Saunders' other books are *Charles and His Lamb; Deficient Saints; For His Country; Beautiful Joe's Paradise; Princess Sukey,* and *Alpatok: The Story of an Eskimo Dog.* Miss Saunders was born at Milton, N. S. She has taken an active part in many philanthropic projects, notably those for preventing cruelty to animals.

SAUSAGE, *saw'sayj,* a food preparation consisting of finely chopped meat, highly seasoned. If prepared in a packing house it usually has a casing made from the intestine of some animal; household sausage is generally encased in a long, cotton sack. In the great packing houses of the United States, where the manufacture of sausage is one of the most profitable branches of the meat-packing industry, the meat chiefly used consists of trimmings, particularly those from the head and hoof. The meat is first minced, then mixed with potato flour and water, two-fifths of the total content being meat, two-fifths potato flour, and one-fifth water. The seasoning added includes such spices as sage, pepper, salt, ginger and mustard. The sausage casings are cleaned by machinery, and are filled with meat through a tube attached to the open end of a stuffing machine. Such sausages usually are sold in strings, whence the expression "link sausage."

Among European varieties of sausage, the Bologna sausages of Italy and the smoked sausages of Germany are held in high favor. The former consist of veal, salt beef, salt pork and bacon, seasoned with sage, ground pepper and mixed spices and herbs. The German sausage is made of fat and lean pork which has been rubbed with saltpeter, black pepper and allspice and preserved for about a week. After being cut up, the meat is mixed with shreds of garlic, pressed into a casing made of ox skin, wrapped in muslin and then smoked in the manner of ham. The ancient Romans highly esteemed a sausage made in Lucania, Southern Italy, containing fresh pork and bacon, nuts, herbs and spices.

Sausages are marketed under various trade names, including Arles, banquet, Bologna, country, Holsteiner, Frankfort, Lyons (made of pure ham), pork, salmi, summer, tongue and Wienerwurst. They consist, in varying proportions, of water, protein, fat and ash. Sausage meat is not, generally speaking, classed among the highly digestible foods. Pork sausage has about the same nutritive value as smoked lean bacon or fat pork chops, and Frankfort sausage averages with fat loin of veal. Sausages are prepared for the table in various ways, boiling, frying and broiling being common methods of cooking. Bologna sausage requires no cooking, but is sliced and eaten as a cold meat. See MEAT AND MEAT PACKING.

SAVANNA, *sa van'a,* a large tract of land covered with vegetation which consists chiefly of tall, stiff grasses growing in dense tufts, and low trees irregularly distributed. The pampas of South America, the prairies of Central North America, the steppes of Europe and the plains of Central Africa are all savannas, varying somewhat in character of vegetation. Most of these plains furnish excellent grazing districts for cattle. The savannas of Central Africa are

the homes of immense numbers of large animals, the "biggest game" of the world, and the prairies of America are rich agricultural regions.

SAVANNAH, GA., the greatest seaport on the Atlantic coast of the United States south of Baltimore, and, next to Atlanta, the largest city of the state in population. Historically it is one of the most interesting cities of the South. It is the county seat of Chatham County, and is situated eighteen miles from the sea on the Savannah River, which here separates Georgia from South Carolina. Atlanta is 260 miles northwest, and Jacksonville, Fla., is 172 miles south. Railroad transportation is provided by the Southern, the Central of Georgia, the Atlantic Coast Line and the Seaboard Air Line. There is water transportation by river boats to Augusta and by steamers to other Atlantic ports and to Europe. The population increased from 65,064 in 1910 to 83,252 (Federal census) in 1920; negroes comprise about one-half of this number, and about 3,500 are foreign born. The area of the city is nearly seven square miles.

Description. The city is built on a plateau about fifty feet above sea level, and has a mild climate, due in part to the influence of the Gulf Stream. The wide streets, which cross each other at right angles, are so abundantly shaded with magnificent moss-hung oaks and with magnolia and palmetto trees that the city is popularly known as the *Forest City*. Toward its center is Forsyth Park, whose tropical vegetation makes it one of the most attractive parks in the South. Its extension, called the "Parade Ground," a military plaza owned by the militia companies of Savannah, contains a magnificent monument to the Confederate dead.

The park reservations cover about 180 acres, including about thirty squares, which contribute greatly to the beauty and charm of the city. In some of these squares monuments have been erected to General Oglethorpe, who founded the city, General Nathanael Greene, William Washington Gordon, Count Pulaski and William Jasper. Colonial, Oglethorpe Avenue and Daffin are the most noted of the larger parks. Estill Avenue, Gaston, Bull and Abercorn streets, with their stately mansions, fountains and sunken gardens, are among the most beautiful boulevards in the residential district. Near the city are several islands, frequented in winter and in summer for their fine beaches.

Buildings and Institutions. The principal commercial thoroughfare, Bay Street, contains the city hall, built in 1906 on the site of the old one erected in 1779, the Cotton Exchange and the customhouse. A Federal building, county courthouse, Masonic Temple, Union Station, Knights of Columbus and Knight Templar buildings, three armories, the Telfair Academy of Arts and Sciences, the city auditorium, Savannah and Hicks hotels and some handsome modern bank buildings are among the most notable structures of the city. For advanced education there are the Benedictine College, Chatham Academy, Georgia State Industrial College (for colored students), and the public libraries. The benevolent institutions include Savannah and Saint Joseph's hospitals, Oglethorpe Sanitarium, Georgia Infirmary for colored people, and homes for the orphaned, the aged and the friendless. Christ Church, erected in 1838, replaces the old one built in 1740. On this site John Wesley, the founder of Methodism, first preached in America.

Commerce and Industry. The steamship companies and railroad terminals, which occupy four miles of wharves, provide modern facilities for shipping freight. Savannah is one of the largest naval-stores ports and one of the largest export ports for sea island cotton in the world. It also ships great quantities of rice, lumber, sugar cane, fruits and vegetables, the products of a large fertile surrounding territory, cotton goods, cottonseed products, turpentine, rosin, fertilizer and phosphate. Although Savannah is primarily a shipping center, its manufactures are of considerable importance. Besides the manufactures listed among its exports, it makes foundry, machine-shop and lumber-mill products. There are also large railroad car and repair shops here. In 1920 there were 147 manufacturing establishments, capitalized at $18,276,000; value of products, $18,603,000.

History. The settlement made at Savannah in 1733 under James Edward Oglethorpe was the first European colony in Georgia; a granite seat in Bay Street marks the spot where the first tent was pitched (see illustration, page 4345). Among later arrivals were John and Charles Wesley, who came in 1735 but two years afterward returned to England. The city was the seat of government for Georgia until it was taken by the British under Colonel Campbell in 1778. The first legislature met in Savannah in January, 1755, and in 1775 the first Provincial Congress was convened there. In 1779 the city was unsuccessfully attacked by a French fleet under D'Estaing and an army under General Benjamin Lincoln. At this time

Count Casimir Pulaski and Sergeant William Jasper were mortally wounded. Ten years later the city was incorporated.

During the War of Secession it was the depot of supplies for the Confederate army; hence it became the objective point in General Sherman's famous march to the sea, and was taken by him in December, 1864, and held by the Federals until the close of the war. Twice the city was ravaged by fire; the loss in 1796 was estimated at $1,000,000 and in 1820 at $4,000,000. The first steamship to cross the Atlantic Ocean, the *City of Savannah,* sailed from this point to Liverpool in 1819. T.P.

SAVANNAH RIVER, a river which forms a large part of the boundary between Georgia and South Carolina. The main stream is formed by the junction of the Tugaloo and the Seneca (or Kiowee) rivers, which rise near the southern boundary of North Carolina and unite on the Georgia-South Carolina boundary a few miles west of Anderson, S. C. From this point the river flows in a south-easterly direction, emptying into the Atlantic through Tybee Sound. A channel twenty-eight feet deep has been cut from the ocean to the city of Savannah, a distance of eighteen miles, for the use of heavy vessels (see SAVANNAH). Smaller vessels can ascend the river 230 miles, as far as Augusta, Ga., a city of cotton mills. The main stream is about 450 miles long.

SAVE, *sahv,* a river of Europe which rises in Austria in the crownland of Carniola and falls into the Danube at Belgrade, Serbia, about 450 miles from its source (see map of Europe following page 2092). It is navigable for steamers for over three-fourths of its course, though occasional shallow places, shifting sandbanks and a varying current offer difficulties to navigation. The principal tributaries of the Save are the Kulpa, the Unna, the Vrbas, the Drina and the Bosna. The Drave, another tributary of the Danube, and the Save flow in courses almost parallel.

SAVINGS BANKS. Until modern times Christian people were forbidden by their Church to accept interest in return for the use of their money. This prohibition and that in *Deuteronomy,* "Thou shalt not lend upon usury to thy brother" (in which *usury* means merely interest, not excessive interest), were justified by the fact that in former days people never borrowed money unless in trouble, when kindness would inspire a gift instead of a loan. But with the advent of the age of capital and industry, and the development of the idea that those who do not have present need of their money can serve the world by lending to those who are able to employ it productively, religious objections to interest vanished. Towards the end of the eighteenth century men began to see that the hope of interest might encourage people who otherwise squandered their earnings and swelled the ranks of the poor, to see, with Ben Franklin, that

> A penny saved is two pence clear,
> A pin a day 's a groat a year.

Then the churches began to encourage the establishment of savings banks, the first of which had been founded in Brunswick, Germany, in 1765.

Though the first savings banks in the United States, founded in 1816, were called the Philadelphia Savings Society and the Provident Institution of Boston, savings banks in America have on the whole been business enterprises rather than charitable foundations. In Great Britain and some other countries, on the contrary, depositors are guaranteed a fixed rate of interest by the government, which is obliged to pay out money every year because the banks do not earn enough to pay the established rate. In the United States there are two important classes of savings institutions, the *mutual* banks, whose depositors are its owners, and the more numerous *stock* banks, whose stockholders make a profit by investing the money given to them as savings. For both types the state government, in order to protect depositors, usually prescribes the nature of investments that may be made. But though these banks guard $5,000,000,000 in savings for more than 11,000,000 people, the greater part of the savings funds of the country are in the savings departments of regular banks (see BANKS AND BANKING).

In Canada there are a few banks specially for savings, but, as in the United States, the chartered banks handle most of the savings accounts.

Postal Savings Banks. England was the first country to utilize the organization of the postoffice and the confidence which people feel in their government, in a savings scheme. The English system was inaugurated in 1861 and was copied in Canada six years later. Though nearly all prominent nations have had postal savings banks for a number of years, the United States did not establish them until 1910.

In order to insure that postoffice banks shall benefit only those whose funds are small, there is in Canada a rule that the deposits of any one person must not exceed $1,000 in any one

year, nor total more than $3,000. In the United States the regulation is that the total interest-bearing deposits of an individual shall not be above $1,000, but larger amounts are accepted if the depositor wants no interest. No one may deposit less than one dollar at a time, but savings of smaller amounts may be made by purchasing a ten-cent card and attaching ten-cent stamps to it until it is worth one dollar. Two per cent interest is paid in the United States, three per cent in most other countries. W.F.Z.

School Savings Banks. In Europe, special banking arrangements for school children have existed for a century, but in the United States only since 1885. The usual method is for a school to accept deposits from its children, and to place the total sum in a savings bank. When a child has a certain sum, say one dollar, to his credit, he is given an individual account. Money cannot be withdrawn except in the presence of a parent or guardian and with the written consent of the teacher. Millions of dollars have been saved by American children in this fashion. The stamp system is less successful because stamps may be lost or sold.

In Canada. The Parliament of Canada passed an act authorizing the establishment of school savings banks in 1906. The act requires that all money collected in school banks shall be deposited in the Government Post Office Fund. The head office of the Canadian Penny Bank System is in Toronto. By law the work of the managing board must be done without any remuneration. In Ontario the Boards of Education are authorized by statute to purchase the necessary books and stationery. A bank in each district receives the amount collected each week, and once a month forwards to the head office the amount collected for the month. Each child is given a book in which his deposits are entered. There are over $400,000 on deposit in the Penny Banks of Canada. J.L.H.

SAVONAROLA, *sav o na ro' la,* GIROLAMO (1452-1498), an Italian monk and reformer, born at Ferrara. In youth he became familiar with medieval learning, and it is thought that an unhappy love affair caused him to discontinue his medical studies and become a monk. He joined the Dominican Order at Bologna in 1475, where he gave himself up to the severest kind of penance and humility.

In 1482 Savonarola began to preach—fiery, spontaneous outbursts of indignation against the wickedness of the world; he went from Ferrara to Florence, then to Brescia, and again, in 1490, back to Florence. The following year found him elected prior of Saint Mark's. His sermons were impassioned denunciations of existing conditions in both Church and State. Lorenzo de' Medici, of the reigning house (for Florence was not at this time a democratic republic), tried to win over Savonarola to his side, but his death in 1492 prevented the accomplishment of this. Thereafter the Piagnoni, or Democratic party, came into power and Savonarola was greatly strengthened by their fervent support. The invasion of Charles VIII of France only added to the confusion and hastened the destruction of the Medici.

SAVONAROLA

A great change swept over the pleasure-loving city of Florence while Savonarola, as dictator, swayed the emotions of the people by his fervent puritanical exhortations. He expected too much, however, of the Florentines; their ardor cooled, and wearying of virtue they deserted their leader. Pope Alexander VI had not escaped the reformer's bitter attacks and, fearful of his increasing power, decided to excommunicate him. For refusing to listen to the Pope, Savonarola was deprived of his independence by the joining of Saint Mark's to a new branch of the Dominican Order.

A Franciscan friar challenged Savonarola to prove the truth of his teachings by an ordeal by fire; this was undertaken, but the experiment was not carried out, as a heavy rain quenched the flame while they were still wrangling over preliminaries. The zealous monk's life was then in constant danger. The infuriated mob had been deprived of an exciting spectacle, and demanded his arrest and trial for heresy. In prison he was tortured to such an extent that he became physically incapable of resisting attacks. With two fellow victims he was finally executed by a slow and tortuous process, to the very end refusing to recant.

Mystical, given to dreams and visions, enthusiastic and too zealous to be a good judge of what the Florentines would be ready to accept, Savonarola suffered a martyr's death, but it was a death ennobled by high ideals and unswerving devotion to his chosen work. His final words on the scaffold, in reply to the

bishop's formula, "I separate thee from the church militant and the church triumphant," were "Not from the church triumphant; that is beyond thy power." M.R.T.

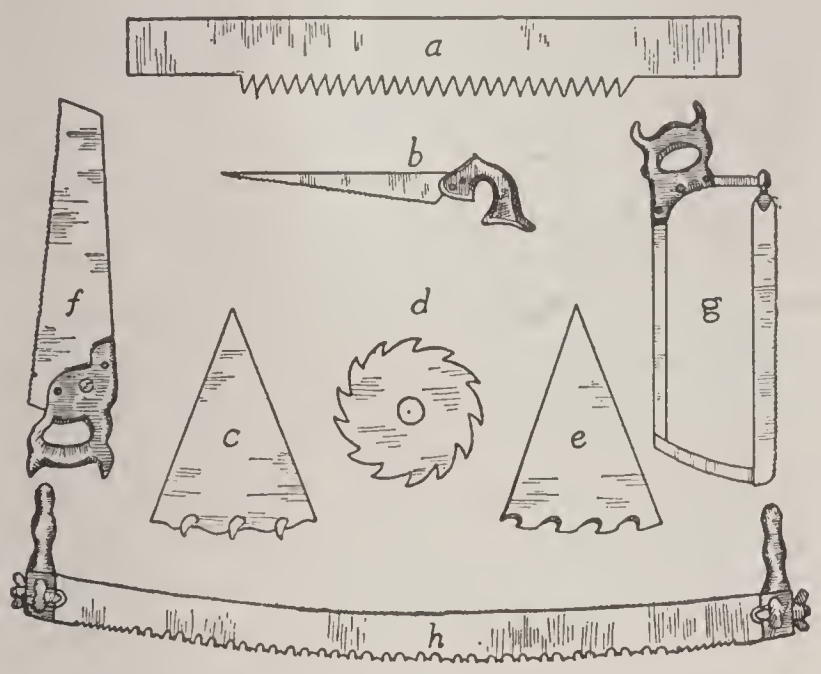
Consult Lucas's *Fra Girolamo Savonarola;* McHardy's *Savonarola,* in World's Epoch Makers Series.

Related Subjects. The following articles in these volumes contain information which will be of interest in connection with this study of Savonarola:

Alexander (Pope)
Charles VIII (France)
Dominicans
Florence
Medici, subhead *Lorenzo the Magnificent*
Ordeal and Combat, Trial by

SAVOY', House of, the oldest reigning European dynasty, to which all the kings of United Italy have belonged. The house was founded by Humbert, first Count of Savoy, who flourished between 1003 and 1056. For history of the dynasty see Italy, subtitle *History of Italy.*

SAW, a cutting tool consisting of a metal blade, one edge having teeth set at slight angles to enable them to cut through wood, stone



VARIOUS SAWS

(*a*) Gang-saw blade; (*b*) compass saw; (*c*) section of inserted-tooth circular saw; (*d*) circular grooving saw; (*e*) section of chisel-tooth circular saw; (*f*) handsaw; (*g*) meat saw; (*h*) crosscut felling saw.

or metal. There are many kinds of saws, each designed to meet certain requirements.

A *circular saw* consists of a circular plate of tempered steel, armed with teeth. This saw is now used in most lumber mills of average size. The saw is often as large as seven feet in diameter, is revolved by machinery, the power being supplied by steam, electricity, water or gasoline, and is capable of sawing through 200 feet of wood, board measure, per minute. Circular saws are now made to cut disk-shaped pieces of wood as well as straight flooring boards and building material.

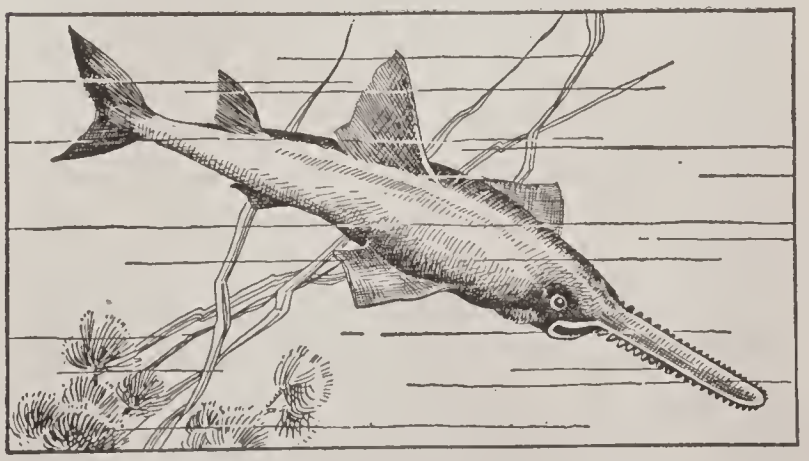
Band saws consist of bands of steel with teeth, the band being passed over and operated by pulleys. This saw is extensively used for making barrel staves and many of the thinner parts of furniture. The band saw and the circular saw are both stationary, the wood being placed on a table and pressed against the cutting edge of the saw.

A crosscut saw, chiefly used in cutting logs, is about eight feet long and provided with teeth which cut in the backward as well as the forward motion of the saw. The blade has a handle at each end and the saw is operated by two men who alternately pull the saw across the surface of the wood. No pressure is applied, the weight of the saw being sufficient to enable it to cut through the hardest woods.

Butchers' and machinists' saws are made of tempered steel and have very narrow blades with fine teeth. A wood saw has a narrow blade mounted on a frame of light but strong wood. These operate on the principle of the crosscut saw, but are short and are operated by one man.

Gang saws consist of a dozen or more saws placed parallel to one another at equal distances apart. Such saws cut a vast amount of lumber, reducing the roughly squared timber of an entire log to boards of the required thickness in one operation. The saws are set as far apart as the thickness of the boards to be cut, and the sliding frame on which the logs are placed is moved forward against the saws. The productive power of gang saws is almost unlimited. F.ST.A.

SAWFISH, a family of ray fish whose chief characteristic is the possession of a flat, sword-like snout, which is used as a weapon of offense and defense. Each side of the "saw" is provided with a series of sharp teeth, and with



A SAWFISH

it the fish viciously tears open the bodies of its victims, which are said to include such large marine animals as whales. Shoals of small fishes suffer particularly from attacks of saw-

fish, and they have been known to drive the saw through the hulls of ships. There are five species, distributed through the warm parts of the ocean. They are large fish, some of the saws being six feet long and a foot wide at the base. An American species, common in the coast waters of the Southern United States, grows to be fifteen feet long, including the saw. It makes its way up the Mississippi River for many miles from its mouth, and does considerable damage to fishermen's nets.

SAXE, *sax,* JOHN GODFREY (1816-1887), an American humorous and satirical poet. He was born at Highgate, Vt., educated at Middlebury College and admitted to the bar. Thereafter he served as attorney-general and as editor of a Burlington, Vt., newspaper, before going to Albany, N. Y., where he edited the *Evening Journal* and became well known through his writings and his lectures. Saxe ranks next to Holmes in humorous poetry, and his verse is always bright and attractive. Among his publications are *The Money-King and Other Poems, Leisure-Day Rhymes* and *Fables and Legends of Many Countries.*

Saxe's literary style is well shown in the following stanza from one of his poems:

> God bless the man who first invented sleep;
> But blast the man, with curses loud and deep,
> Who first devised, then went 'round advertising
> That artificial cutoff, early rising.

SAXIFRAGE, *sak'si frayj,* derived from a Latin word meaning *stone breaking,* is the name applied to a genus of plants, many of which grow in stony soil or from clefts in rocks. They are found for the most part in cold and temperate regions of the northern hemisphere. The leaves of some of the European varieties are eaten as salad, and the root is used medicinally. These hardy plants have stalks from one to two feet high, while the foliage varies, being mossy, leathery-leaved or silvery. The many tiny seeds are enclosed in little capsules, and the blossoms are of all colors. Some of the species are grown for ornamental purposes. Among the best known are *lady's cushion, beefsteak* or *strawberry geranium, none-so-pretty, golden saxifrage* and *swamp saxifrage.*

SAXONS, *sax'unz,* a Germanic people who took part in the invasions of the island of Britain in the fifth and sixth centuries and so contributed to the founding of the English kingdom. The Saxons first appear in historical records in a book written by Ptolemy in the second century. They seem then to have occupied the land corresponding to Schleswig, but by the sixth century they had spread over Northwestern Germany as far east as the Elbe River. The Saxons who remained in Germany were subjugated by Charlemagne, who forced them to accept Christianity and made their country a part of his empire. During the ninth century a Saxon duchy was established, but this passed out of existence after three centuries. The name Saxony, which was originally applied to the home of the Saxons, came in time to be the designation of a kingdom in the east of Germany.

Related Subjects. The reader is referred to the following articles in these volumes:

Anglo-Saxons
Charlemagne
England, subtitle *History*
Saxony

SAXONY, *sak'suni,* until 1918 a kingdom, the third state in the German Empire in population and the fifth in area. After the revolution of that year it became an important unit in the new republic. In proportion to its size it is the busiest industrial section of Germany. It holds first rank in the production of textiles and contains some of the most important centers of iron manufacture. This small triangular kingdom lies on the eastern frontier of Germany, with Prussia on the west, north and east, Bavaria on the southwest and Czecho-Slovakia (a new state) on the south. It has an area of 5,789 square miles and population (1919) of 4,663,298. In Saxony there are about 805 people to the square mile, the density of population far exceeding that of any other German state. There are two cities of more than half a million population, Leipzig and Dresden (both of which see).

The country is traversed by the Elbe River, the only stream of any great commercial importance, and has an agreeable, moderate climate. The fertile soil receives an abundance of rain, and produces large crops of wheat, rye, barley, oats, potatoes and hay. Orchards, vineyards and flax fields also flourish. Among mineral products, silver, coal, iron, lead, tin, marble and precious stones are important. There are a number of mineral springs, those at Bad-Elster being visited by large number of health seekers. Besides the prosperous textile factories Saxony has large establishments producing furniture, paper, watches, glassware, pianos, machinery and many other commodities. At Meissen is the famous porcelain factory where Dresden china (which see) is produced. Another profitable source of income is the forest area; nearly half the wooded land (one-fourth the total area) belongs to the state, and there is

a school of forestry at Tharandt. Educationally the kingdom is one of the most important in Germany. Leipzig has a great university and a famous royal music school, and Dresden is noted as an art, musical and literary center.

SAXONY

(*a*) Former kingdom of Saxony; (*b*) a small Prussian province, bearing the same name.

The name Saxony was originally applied to a large section in Northwestern Germany inhabited by the Saxons (which see), and this territory was quite distinct from the modern kingdom. It was late in the Middle Ages before the name was applied to the territory in the east of Germany from which the modern Saxony developed. The present limits of the kingdom were defined in 1814 by the Congress of Vienna, after the defeat of Napoleon at Leipzig. Saxony joined the North German Confederation at the close of the Seven Weeks' War (which see), in which it was allied with Austria against Prussia, and in 1871 it became a member of the German Empire (see GERMANY, historical summary on pages 2478 and 2479). Saxony suffered more domestic privations than many of the other parts of the German Empire in the War of the Nations. Its inland position was in part responsible for its unfortunate condition, but inadequate crops tended in no small degree to the despair of the people. The new government is expected to be republican in form, and a part of the greater republic. B.M.W.

SAXOPHONE, *sax'a fohn,* a deep-toned brass musical instrument, used with good effect in military bands, but not adapted to orchestral use, as the tones are not sufficiently fine and sympathetic. The instrument is rarely used in solo work. Its name comes from that of Adolph Sax, who invented it in 1840. The instrument is a conical tube, curved upward at the bottom and having a small part turned backward at the top, where the mouthpiece and a reed like that of the clarinet are fitted. Twenty keys are arranged on its uncurved length, which are manipulated by the first three fingers of each hand. Saxophone music is written in the treble clef.

A SAXOPHONE

SCALE, in music, a succession of notes arranged in alphabetical order from a given note. The simplest series is the octave of eight notes, or the *major scale,* which contains five whole steps and two half-steps, the latter between three and four (*mi* and *fa*) and seven and eight (*ti* and *do*). This scale does not make use of all the tones within the octave, for if all the half-steps are counted the octave will be seen to contain twelve tones. A scale containing all of these twelve tones is said to be *chromatic.* Another term often used in connection with scale is *minor;* by minor scale we mean one which begins on the sixth tone of the major, or *la.*

These various points are discussed in these volumes in the article MUSIC, under the subheads *A Lesson on the Major Scale, How to Remember Scales, A Lesson on the Chromatic Scale* and *A Lesson on the Minor Scale.*

SCALE IN'SECT, or **BARK LOUSE,** a family of insects including several species that are very destructive to fruit plants. They are so called because they secrete scales consisting of cast skin and excreted matter. These scales, which form a body covering, are sometimes white and powdery and sometimes glassy or shell-like. The scale insects injure plants by sucking the sap. Of the 1,400 or more known species, nearly 400 are found in America, but in many instances they are not recognized as insects by fruit growers because they are so unlike the typical members of that class. The small black or brown spots sometimes seen on oranges are scale insects, and there is one species in which the females resemble small oak galls.

Probably the best known of the group is the San José scale of California. The San José scale belongs to the most pernicious division of the family, the adult females of which are decidedly a degenerate type of insect. That is, they remain motionless during the greater part of their existence, and are lacking in legs, wings, eyes or feelers. Other common American scales are the cottony cushion and the cottony maple scales, the scurfy bark louse, the pine-leaf and the rose scales and the mealy bug. Cochineal and lac are commercial substances produced by insects of this family.

Consult Howard's *Insect Book;* Comstock's *Manual for the Study of Insects.*

Related Subjects. For further information relating to this subject the reader is referred to the following articles:

Cochineal
Insect
Insecticides and Fungicides
Lac
Mealy Bug
San José Scale

SCALES, *skaylz,* the thin, flat plates which form the outer covering of most fishes and of many serpents and lizards. A few mammals are also scale-covered, such as the scaly anteater. Scales consist usually of a horny substance, and they overlap one another like shingles, forming a protective armor for the softer body; they vary in size, shape and arrangement according to the size and kind of animal they cover. In botany, scales are little, flaky leaves which cover buds on trees and woody plants in cold and temperate climates, to shield them from sudden changes in temperature. The regular sections of fir cones have the same name. The wings of butterflies and moths are covered with scales so tiny that they appear like little specks of down.

SCALLOP, *skahl'up,* a group of bivalve shellfish related to the oysters. The two valves of the shell covering are shaped like fans, and in some species they are marked with prominent ridges which radiate from the hinge. The shell ends in an earlike extension, in which the hinge is placed. Along the margin of each mantle fold (the membrane lining the shell) are a row of slender tentacles and a fringe of bright blue eyes. Adult scallops have a rudimentary foot with which they plow through the mud. In swimming, the animal opens the valves quickly, catching a quantity of water between the mantle folds, and then closing its shell. Because of pressure within, the water is forced out in jets through round openings on the hinge, and the resulting movement against the water outside pushes the animal along in a zigzag fashion, with the broad end of the body forward.

Two species of scallop are found along the Atlantic shores of North America—the *common* scallop, abundant in bays and inlets from the Gulf of Mexico to Massachusetts Bay, and the *great* scallop, occurring north of Vineyard Sound, especially along the coasts of Maine, Nova Scotia, Labrador and in the Gulf of Saint Lawrence. The latter is the larger of the two, sometimes growing to be four or five inches wide. The only part of these animals sold as food is the adductor muscle, which the scallops use to open and close their valves. This muscle tastes like lobster meat and is considered a great delicacy, as it is soft and tender. Scallops are caught in great numbers along the coasts of New England. Their shells are "planted" in oyster beds to provide lodging places for oyster spat.

In the Middle Ages pilgrims to the Holy Land wore in their hats a scallop shell as a token of their pilgrimage.

SCALP, *skalp,* the outer covering of the skull. It is composed of skin, the tendon of the muscle that moves the skin of the forehead, blood vessels and cellular tissue. It is on the scalp that the hair grows most abundantly, but otherwise the skin of this portion of the body is much like that of any other. The hygiene of the scalp is closely related to that of the hair. Injuries to the scalp should be treated with scrupulous care to prevent infection; neglect may result in erysipelas and other diseases. In Indian warfare it was customary to cut off from the head of a victim a circular piece of skin and hair, about four inches in diameter; this custom was known as *scalping,* and the detached portion, which a brave would proudly display as a trophy of war, was called a *scalp.*

Related Subjects. The reader is referred to the following articles in these volumes:

Dandruff
Hair, subhead *Care of the Hair*

SCAMMONY, *skam'o ni,* a twining, climbing plant, native to Asia Minor, having white flowers and thick, fleshy roots usually two or three feet in length. From the roots is obtained a milky, white juice, which, upon drying and hardening in the air, forms a gum resin of medicinal value. It is used in laxative preparations, as the resin is a powerful cathartic.

SCANDINAVIA, *skan di na'vi a,* the name given in a restricted sense to the peninsula of Norway and Sweden, but more broadly used to designate the lands inhabited by Scandina-

vian people, Denmark, Iceland, Norway and Sweden. The word *Scandia* originated with the Romans, who used it to describe a large island, believed to be north of the Baltic Sea. The southernmost portion of Sweden is still known as Scandia; it was not known in Roman days to be connected with the mainland at the north.

Related Subjects. The reader is referred to the following articles in these volumes:

Denmark	Norway
Iceland	Sweden

SCAPEGOAT, *skayp'goht,* one of two goats received by the Jewish high priest on the Day of Atonement, upon which he cast lots, one for Jehovah and one for Azazel (*Leviticus* XVI, 10). The first was killed as a sin offering, and upon the second, or scapegoat, the priest laid his hands, confessing over him the people's sins and then sending him into the wilderness as a token that the sins had been put away. The original significance of "Azazel" has been lost, but it doubtless refers to the spirit of evil.

In modern usage, a person made to bear the blame of others is called a scapegoat.

SCARAB, *skair'ab,* a group of beetles having the peculiar habit of rolling up bits of refuse into pellets and using them as food for themselves and young. The sacred scarab of the ancient Egyptians is the best known of the group. The Egyptians regarded the pellets as symbols of the world, and projections on the heads of the beetles were considered emblems of the rays of the sun. The scarab was also a symbol of the resurrection and of immortality, and figures of the insects were carved out of stone or metal and used as charms. Such devices were called scarabs. Usually the heart of a deceased person was removed, and in its place was put a large scarab. These insects belong to the same family as the tumblebugs, June bugs and cockchafers.

SCARLET FEVER, *skahr'let fe'ver,* an acute infectious disease to which children are especially susceptible. Its most striking symptoms are sore throat and a rash that breaks out all over the body. *Scarlatina* is another name for this disease. An attack of scarlet fever begins usually with vomiting, headache, shivering and sore throat. From three to fourteen hours after the spell of vomiting the rash may be noticed on the chest, and a high fever develops. The eruption, which is followed by peeling, fades in about a week, and the temperature drops to normal in about the same period. The throat is the organ which must be watched and treated with the greatest care. A victim of this disease should be isolated immediately after the attack begins, be placed in a quiet, well-ventilated room and be put on a liquid diet. The physician in charge will prescribe measures to control the fever and give directions as to bathing and the use of antiseptic sprays for the throat.

Among the dangers connected with scarlet fever are ear and eye complications, resulting in impaired hearing and sight. In some cases the poison of the disease affects the brain and causes nervous prostration. The heart and kidneys are other organs frequently affected. As discharges from the nose, throat and ears are carriers of scarlet fever, the strictest precautions must be taken to prevent its spreading. All secretions must be destroyed and bedding and wearing apparel be thoroughly disinfected. There are several forms of the disease, varying in intensity and degree of fatality. The organism which causes scarlet fever has not been identified.

SCARLET LETTER, a famous novel by Nathaniel Hawthorne, considered by critics to be one of the finest and loftiest examples of fiction in American literature. It was published in 1850, and was the first of the author's long novels—possibly his masterpiece. The scene is laid in a colonial village of Massachusetts, and the story has a background of Puritan intolerance in the colonial period. Written in that clear and flowing style which was one of Hawthorne's best literary traits, it reveals the spiritual effect on two characters of sin concealed and sin revealed. These characters, the Reverend Arthur Dimmesdale and Hester Prynne, are the hero and the heroine. A bright element in this somewhat austere book is the occasional appearance in the narrative of little Pearl, the child of Arthur and Hester. The novel is universally admired for its fine descriptions and faithful and sympathetic delineation of character, and for the masterly way in which it points a great moral. At the same time it is absolutely free from any trace of "preaching." The title refers to a scarlet letter *A* worn by Hester on her dress as a badge of her sin.

SCHAEFFER, *sha'fer,* Nathan C. (1849-1919), an American educator and author, born in Maxatawny Township, Pa. He was graduated at Franklin and Marshall College in 1867 and then pursued advanced courses in the universities of Leipzig, Berlin and Tübingen. Returning to his native country and state, he taught for two years in Franklin and Marshall College and in 1877 was appointed principal of

the Keystone State Normal School. In 1893 he became superintendent of public instruction in Pennsylvania, and during his long incumbency of that position brought his state into the front rank in educational matters. Professor Schaeffer has served as president of the National Education Association, as chancellor of the Pennsylvania Chautauqua, and has held other educational positions, and is widely known as an editor and author. His most important publications are *Thinking and Learning to Think* and *History of Education in Pennsylvania.*

SCHELDT, *shelt,* a river of Belgium which forms one of the most important commercial waterways of Europe. Its navigation has been made the subject of international treaty, and its waters were declared free to all nations in 1863, after Holland had maintained control of navigation privileges for over two centuries. During the War of the Nations, which began in 1914, Germany made an unsuccessful attempt to have the river declared free from Belgian jurisdiction. This was refused by the allied powers.

The Scheldt rises in the northern part of France in the department of Aisne, entering Belgium near Bleharies. In Belgium it follows a northeasterly course until it reaches Antwerp, fifteen miles below which it separates into two channels, the East and West Scheldt. These form a double estuary which flows into the North Sea. The river is 250 miles in length and has been made navigable for about 210 miles by means of locks. It is connected by canals with the chief cities of France and Belgium. Important among the cities on its banks are Oudenarde and Ghent.

SCHENECTADY, *skeh nek'ta di,* N. Y., the county seat of Schenectady County, is a growing industrial city in the east-central part of the state, sixteen miles northwest of Albany and 165 miles north of New York City. It is on the Mohawk River and the New York State Barge Canal (which see), and on the New York Central and the Delaware & Hudson railroads. Electric interurban lines extend to a number of neighboring cities. Between 1910 and 1920 the population increased from 72,826 to 88,723.

Schenectady occupies an area of about eight square miles and is favorably situated on sloping land along the river, at an elevation of 230 feet above sea level. The site was once that of the principal village of the Mohawk Indians. The older portions of the town are along the river, and there remain some splendid examples of the architecture of the early Dutch and Colonial periods. Prominent buildings are those of Union College, the Federal building, completed in 1913 at a cost of $270,000; a county courthouse and jail, Carnegie Library, city hall, high school building costing $560,000, Y. M. C. A. and Y. W. C. A. buildings, Van Curler Opera House, and Ellis and Mercy hospitals. Among the institutions are a day nursery, Old Ladies' Home, Children's Home and the County Tuberculosis Hospital. The place where a great Indian massacre occurred in 1690 is marked by an Indian monument. Central Park (124 acres) and Crescent and River Front parks are the principal areas of the city's park system.

The industries of Schenectady, largely developed since 1880, have, according to local estimate, an annual productive value of $60,000,000. Here are located two extensive plants: the General Electrical Company, employing over 20,000 men in the manufacture of electrical apparatus of every kind; and the American Locomotive Works. Among other industrial establishments are foundries and machine shops, and manufactories of clothing, mica insulators, display frames, patent medicines, knives, brooms and brushes.

In 1662 Schenectady was settled, on land purchased from the Mohawks, by a party of well-to-do settlers under the leadership of Arendt van Curler. The settlement prospered, but in 1690 suffered a terrible French and Indian massacre, when sixty of its 250 inhabitants were murdered and more than that number carried into captivity. Another massacre occurred in 1748. The place was again rebuilt and became an important depot of the Mohawk River boat trade. Chartered as a borough in 1765, Schenectady became a city in 1798. The city was partially destroyed by fire in 1819. H.W.R.

Consult Powell's *Historic Towns in the Middle States;* Roberts' *Old Schenectady.*

SCHILLER, *shil'er,* Johann Christoph Friedrich von (1759-1805), a German poet, born at Marbach, Württemberg. He was educated at the Karls-Schule at Stuttgart, where for a time he studied law and later took up medicine. There, when only seventeen years old, he began to write his romance, *The Robbers,* a play that awakened great interest in Germany when published in 1780. At twenty-one years of age he had written a treatise *On the Connection of the Animal and Intellectual Nature of Man,* which was published in impor-

tant Berlin journals and discussed by the leading European scientists of the day.

When in 1782 *The Robbers* was performed at Mannheim, Germany, Schiller, then an army surgeon, secretly left his regiment to see it, and was arrested by the military authorities. He soon escaped from prison and in a remote village wrote two other plays, *The Conspiracy of Fiesco* and *Cabal and Love*. Afterwards he ventured to return to Mannheim, where, unmolested, he became poet to the local theater, and composed some romantic verses that were widely copied. He then conceived the principal ideas for the plot of his famous drama *Don Carlos,* and went to Dresden to prepare himself for the task by close historical study of the United Netherlands. The play was presented at Leipzig in 1789 and gained him national fame. This success won for him the friendship of some of the greatest writers of Europe, among them Goethe, who procured for him the professorship of philosophy at the University of Jena. He lectured more often, however, on history than on philosophy, and nearly all his writings during the next six years dealt with historical themes. It seemed for a time that the poet was lost in the scholar, but the literary influence of Goethe gradually prevailed, and after 1795 he produced some of the most spirited ballads and songs in any language.

SCHILLER

In 1799 he again wrote a masterpiece for the stage in his *Wallenstein,* and during the next two years composed the famous tragedies, *Maria Stuart,* dealing with Mary, Queen of Scots, and *The Maid of Orleans,* telling the story of Joan of Arc. In 1803 he reached the climax of his power as a writer of dramas in his powerful *William Tell,* a piece of work that has seldom been surpassed in dramatic literature. His last days were spent at Weimar, Germany, where he died May 9, 1805. Schiller's only superior in German literature is Goethe, and it is doubtful whether even the latter surpassed him in vigor and ability to create stirring situations on the stage. His dramas are among the great classics. R.D.M.

Consult Carus's *Friedrich Schiller: Sketch of His Life and Appreciation of His Poetry;* Nevinson's *Life of Schiller.*

SCHILLING, *shil'ing,* JOHANN (1828-1910), a German sculptor whose greatest masterpiece is a colossal national monument commemorating the Franco-German War. This great work is on the Niederwald, a mountain opposite Bingen on the Rhine. Among Schilling's other important works are the *Four Seasons,* at Dresden, a statue of Schiller, at Vienna, the *War Memorial,* a soldiers' monument, at Hamburg, and monuments to Emperor William I and Bismarck, at Wiesbaden. Schilling was born at Mittweida, in Saxony, and received his art education in Berlin, Dresden and Rome. The models of many of his figures are in the Schilling Museum at Dresden.

SCHLESWIG-HOLSTEIN, *shlayz'viK hohl' stine,* a province in the former kingdom of Prussia, in the southern portion of the peninsula which separates the Baltic and the North seas. It has an area of 5,800 square miles, after

LOCATION MAP
Schleswig-Holstein, like a wedge, is crowded between the North and Baltic seas.

Schleswig's vote to rejoin Denmark. Originally the province consisted of two Danish duchies, Schleswig in the north and Holstein in the south (separated by the River Eider), and the Danish language still predominates in the northern sections. In 1910 the population of the province was 1,621,004; the majority of the inhabitants are Protestants. Kiel and Altona are the largest cities; Schleswig, with a population of 20,000, was the capital. The country is for the most part a level plain, with great tracts of moorland in the interior. On the eastern coast there are several good harbors, for the shore line is indented by many narrow inlets, or fiords. On the western coast.

which is all lowland, dikes have been built to shut off the sea. Chief among the rivers is the Elbe, which bounds the province on the south.

The people are engaged chiefly in farming, the important crops being wheat, rye, oats, barley, hay and vegetables. Horses and cattle are raised in great numbers; the cattle of Schleswig-Holstein have a world-wide reputation. Commercially the province is one of the most important in Germany. It is crossed by the famous Kaiser Wilhelm Canal, and the port of Kiel was the foremost naval station of the former empire. Kiel, Altona and Flensburg are all important shipping centers.

Schleswig and Holstein were wrested from Christian IX of Denmark in 1864, by Austria and Prussia, and the two duchies became a part of Prussia in 1866 at the close of the Seven Weeks' War. The northern section in 1920 voted to be returned to the sovereignty of Denmark. The southern section is still German.

Related Subjects. The reader who is interested in Schleswig-Holstein is referred to the following articles in these volumes:

Altona	Germany, subtitle *History*
Bismarck-Schönhausen, Prince	Jutland
Denmark, subhead *History*	Kaiser Wilhelm Canal
	Kiel
	Seven Weeks' War

SCHLEY, *sli,* WINFIELD SCOTT (1839-1911), an American naval officer, commander of the expedition which rescued the Arctic explorer Greely, and senior officer in command at the Battle of Santiago, was born in Frederick County, Md. He entered the Naval Academy in 1856, and was graduated four years later. During the years 1860-1861 he was on duty in China and Japan, and the next year, with the rank of lieutenant, took part in the Mississippi River campaign under Farragut, his first service in the War of Secession. Schley was executive officer on the gunboat *Wateree,* and was advanced to the rank of lieutenant-commander in 1866. He then filled a position as instructor in the Naval Academy for three years. The rank of commander was given him in 1874.

WINFIELD SCOTT SCHLEY

When the third expedition for the rescue of the Arctic explorer, Greely, was sent out in 1884, Schley was given charge of it, and after cruising through 1,400 miles of ice, effected Greely's rescue; in recognition of this service he received a gold medal. In 1886 he published a book entitled *The Rescue of Greely,* and two years later was advanced to the rank of captain. While in command of the *Baltimore* at Valparaiso (1889-1892) several members of his crew were killed by natives. Schley negotiated the difficulty, obtaining an apology and an indemnity of $75,000 from the Chilean government. Later he was selected to convey the body of John Ericsson, inventor of the *Monitor,* to Sweden, and while there was presented with a gold medal by the king. In 1898, Schley, then a commodore, was selected to take charge of the flying squadron in the Spanish-American War. During the temporary absence of Rear-admiral Sampson, Schley on the *Brooklyn* directed the Battle of Santiago, destroying the entire Spanish fleet, for which he was promoted to the rank of rear-admiral. In the controversy which followed this engagement he was declared by some to have been the real victor, but by others was charged with "irregularities," and at his request a court of inquiry was appointed. The report, though not wholly favorable to him, recommended that no action be taken.

Schley was one of the commissioners selected to direct the evacuation of Porto Rico; in 1899 the command of the South Atlantic squadron was given him; but in 1901, in his sixty-second year he withdrew from active service. See SPANISH-AMERICAN WAR. M.R.T.

SCHLIEMANN, *shle'mahn,* HEINRICH (1822-1890), a German archaeologist who made valuable contributions to the world's knowledge of early Grecian civilization. When very young he shipped as a cabin-boy on board a boat bound for Venezuela. The ship was wrecked, but Schliemann was rescued and taken to Amsterdam, where he busied himself in acquiring a knowledge of the principal European languages. He amassed a fortune as a tradesman and retired from business in 1864 in order to devote his entire time to archaeological investigations in the East. In 1870 he began the work of excavating the ruins which he believed to be the site of ancient Troy, and he continued this work, with interruptions, until the year of his death. The Greek courts compelled him to pay $10,000 for the collections he had gathered. These he presented to the Folk-

lore Museum at Berlin. He also began excavations in 1876 on the site of ancient Mycenae in Greece, and in 1877 he unearthed the five tombs which, in the days of Pausanias, were believed to be those of Agamemnon and his companions. His published volumes include *Ithaca, the Peloponnesus and Troy; Trojan Antiquities,* and *Mycenae.*

SCHMALKALDIC, *shmahl kal'dik,* **LEAGUE,** a defensive alliance formed at Schmalkalden, Prussia, in 1531, for the support of religious and political freedom of Protestants, and in opposition to Emperor Charles V and the Roman Catholic states. The League, which was originally composed of nine Protestant princes and eleven imperial cities, was joined later by five other princes and ten imperial cities. The elector of Saxony and the landgrave of Hesse were elected chiefs of the alliance and were commissioned to manage its affairs. In a war of 1546-1547 the Protestant army was forced to retreat, and the imperial army subdued the northern members of the League and advanced into Franconia. The combined armies of Saxony and Hesse were defeated at Mühlberg, on April 24, 1547. Maurice, now elector of Saxony, subsequently accomplished the object of the League. By brilliant diplomacy and generalship he compelled the emperor to grant the Treaty of Passau in 1552, which secured the religious freedom of the Protestants. See Reformation, The.

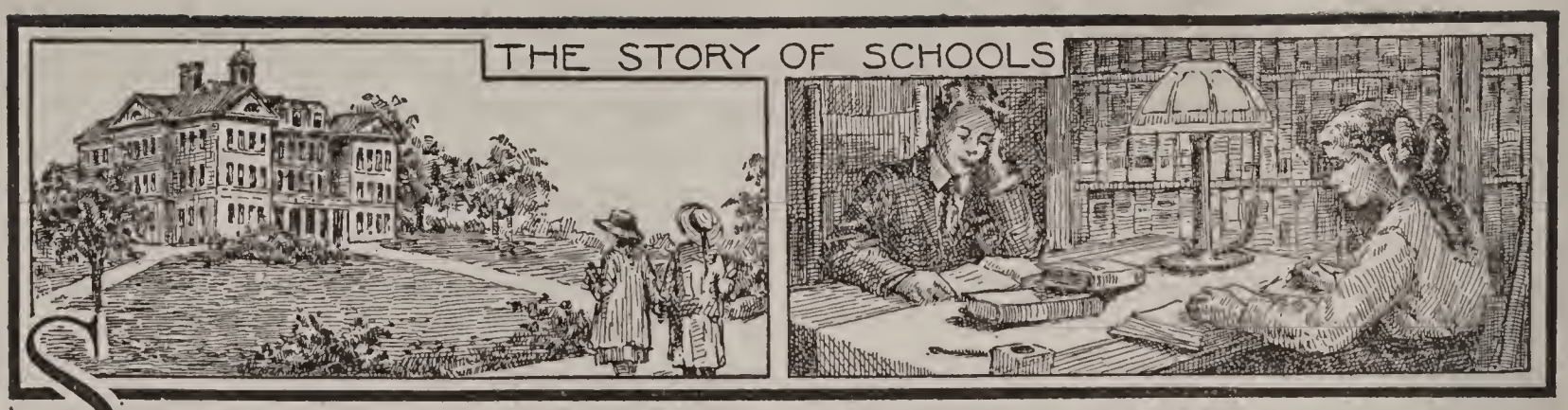
SCHNORR VON CAROLSFELD, *shnohr fon kah'rohls felt,* Julius (1794-1872), one of a group of German painters who at the beginning of the nineteenth century endeavored to revive the Christian spirit of early religious art. They, like the English Pre-Raphaelite school (see Pre-Raphaelites), turned to the early religious painters of Italy for inspiration and guidance. Schnorr was born at Leipzig. For a while he studied at Vienna, but later went to Rome, where the other German painters interested in this movement had gone previously. Here he distinguished himself by painting a series of frescoes on the walls of the Villa Massimi. In 1827 he was commissioned by King Louis of Bavaria to paint for his new castle at Munich a series of frescoes illustrative of the *Nibelungenlied* and incidents in the lives of Charlemagne, Rudolph of Hapsburg, and Frederick Barbarossa. In 1846 he was appointed professor at the Fine Arts in Dresden and director of the royal picture gallery. While here he designed 180 pictures to illustrate the narratives of the Bible, which many consider his finest work. He also executed notable stained-glass windows for Saint Paul's Cathedral, London, and for Glasgow Cathedral. Among his associates were Cornelius, Veit and Overbeck. See Cornelius, Peter von.

SCHOFIELD, *sko'feeld,* John McAllister (1831-1906), an American soldier who served on the Union side throughout the War of Secession. Between 1888 and 1895 he was the commanding general of the United States army. He was born in Chautauqua County, New York, and was graduated at West Point in 1853. At the outbreak of the War of Secession he became major of the First Missouri Volunteers, and commanded in turn the District of Saint Louis, the Army of the Frontier and the Army of the Ohio. In 1862 he was promoted to the rank of major-general of volunteers. During Sherman's Georgia campaign and in the Battle of Franklin he rendered distinguished service and was brevetted major-general in the regular army in recognition of his bravery. Subsequently he was sent to North Carolina, where he captured Wilmington and was otherwise active until the surrender of Johnston. He continued in the army after the war, and in 1868 was made Secretary of War, to succeed Edward M. Stanton. In 1895 he retired with the rank of lieutenant-general. His chief published work, *Forty-Six Years in the Army,* appeared in 1897.

SCHOLASTICISM, *sko las' ti siz'm,* the philosophy of the schools of the Middle Ages. It represented an attempt to fuse the beliefs of the Church with the logic of Aristotle, just restored to Europe by the Saracens. The greatest teachers of the scholastic method were those of the thirteenth century, among them being Albertus Magnus, Roger Bacon, Duns Scotus, and Thomas Aquinas. The latter was known as the "Angel of the Schools" and outlined the whole scheme of Roman Catholic theology in his great work, *Summa Theologia.* Though the later scholastics busied themselves with many unprofitable speculations—such as "How many angels can be supported on the point of a needle?"—the whole movement was valuable in awakening the mental life of Europe from the lethargy of previous centuries, and in preparing the way for the revival of classical learning known as the Renaissance.

Related Subjects. The following articles in these volumes will make clear the references in the above discussion of scholasticism:

Aquinas, Saint Thomas	Duns Scotus, Joannes
Aristotle	Renaissance
Bacon, Roger	Saracens



SCHOOL. An Englishman, on a certain occasion, was showing a friend the evidences of modern enterprise in his town. In passing an imposing structure the stranger remarked that for a factory building it was the finest example he had seen. He asked, "What do they manufacture there?" The answer came at once, "Brains; that's a schoolhouse."

A nation is strong only in the degree in which it recognizes the influence of religion and education; they are the fundamental bases of the state. The masses who compose the state are in accord on this principle. No man, even if he is without religious leanings, cares to establish a home far from any church; neither does he consider property valuable if schools are many miles distant. The one stands for security; the other, for progress. Wherever civilization advances, in the vanguard are found the modest church and the struggling school. When, by chance, these two institutions are late in assembling their forces, there is evidence in plenty of lawlessness and general disorder.

The builders of the American republic, to cite possibly the most conspicuous example, stated the case concretely in the plans they laid for the opening of the great Northwest Territory. The only clause of present-day interest in the Ordinance of 1787 was one which recognized the mighty power that lies in education; it is quoted wherever school bells ring and is printed in countless books, that boys and girls may never forget wherein lies the strength of a free people:

> Religion, morality and knowledge being necessary to good government and the happiness of mankind, schools and the means of education shall forever be encouraged.

The first school for every person is at the mother's knee; "every word spoken by the mother within the hearsay of little children," says Ballou, "tends towards the building of their future careers." The father may strive to do his full duty, but of this first school he is little better than assistant superintendent. The woman endowed with mother love is truly an infant-school specialist, and it is within the mother's power, when eventually the state claims a part in the schooling of her children at the age of seven, to send them to public instructors with ideals firmly fixed and characters deeply rooted.

The state demands that those upon whom its future depends shall go to school; not only are "schools and the means of education" encouraged, but they are made compulsory. When the American Declaration of Independence was published to the world only twelve out of every hundred people in the thirteen new democracies it created were able to write. Small wonder that when one delegate in the Constitutional Convention later pleaded for the people's participation in the government Alexander Hamilton should have said, "The people, Sir; the people is a great beast!" Uncouth, uneducated, untaught in the fine art of clear thinking, the masses were not fit to be intrusted with power. The educated minority set about to remedy the defect which would have made a successful government by the people impossible. "Schools and the means of education" have multiplied until an illiteracy of nearly ninety per cent has been reduced in less than 150 years to an average of five per cent for white people in the whole nation, while in Iowa, Nebraska and Oregon less than two per cent are unable to write.

A COLONIAL SCHOOL

Nearly all schools 150 years ago were under Church control, and a good deal of attention was given to religious instruction. The first school readers were filled with admonitions against frivolity and with warnings of the future state of the wicked. The United States blazed the way for the world in declaring in its new Constitution in 1787 that "no law respecting the establishment of religion or prohibiting the free exercise thereof" should be passed. It has become the sole business of public school systems to train boys and girls in mathematics and the sciences, in literature, in music and in those vocational and domestic arts which prepare them for lives of economic independence and usefulness to their communities and to the state.

Schools have become specialized and systems have been unified until now boys and girls find a straight educational pathway leading from the kindergarten to the state university, with tuition free all along the way. Any boy or girl, given good health and determination, without regard to wealth, may pass through these schools, step by step, quitting the highest institution at last with an endowment of knowledge infinitely beyond the wildest dreams of mankind a hundred years ago.

In the following articles various phases of school systems are discussed. The schools of Canada are described in the articles on the various provinces under the subhead *Education,* and in the article CANADA, subtitle *Education.* Educational conditions in each of the European countries are described under the subhead *Education* in the respective articles dealing with those countries. E.D.F.

Consult Dewey's *Schools of To-Morrow.*

Public Schools

Public schools include all schools that are supported by public funds. In the United States they are classified as common, or elementary, schools, high schools, evening schools, vacation schools, etc. All public schools are conducted according to the law of the state in which they are located; they are therefore under state control. The first settlers in America, whatever their nationality, recognized the importance of education, and public schools were among the first institutions founded by them. These schools are a monument to the wisdom of the forefathers, for through them they made education the chief corner stone of the foundation upon which American institutions were to be reared. Says E. E. White:

> With matchless wisdom they joined liberty and learning in a perpetual and holy alliance, binding the latter to bless every child with instruction which the former invests with the rights and duties of citizenship. They made education and sovereignty coextensive by making both universal.

Common Schools. Common schools are those which give instruction in the common branches and whose work extends from the first grade to the eighth grade, inclusive. While early attempts to provide elementary education were made in Virginia, and by the Dutch in New Amsterdam (New York), it is to Massachusetts that we must look for the beginning of the American common school and the American system of public education. In 1635 the people of Boston assembled in town meeting, requested Philemon Purmont to become schoolmaster and voted him thirty acres of land in part pay for his services. The school begun by Mr. Purmont later became the Boston Latin School, and has had continuous existence to the present time. Other settlements followed Boston's example, and within the next ten years common schools were established in all the New England settlements. In 1647 the General Court of Massachusetts ordered every

IN NEW ENGLAND

Monitor examining slates in a school in colonial days.

town having fifty families to appoint a teacher, whose wages were to be paid by the parents of the children he taught or by the inhabitants in general. At the same time townships having one hundred families were required to establish a grammar school to fit youth for college. The law establishing these two grades of schools laid the foundation of the public school system in the United States. Three years later a similar law was passed in Connecticut, but Rhode Island made no attempt to form a school system until 1790.

The Dutch established a system of public schools before New Netherlands was taken by

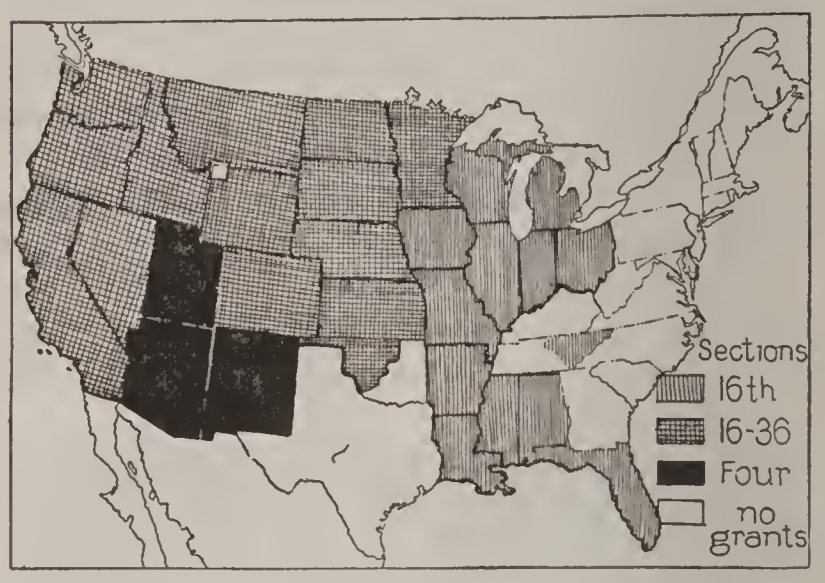
the English. After this event but little attention was given to public education until after the Revolutionary War. Schools were founded by the Swedes in New Jersey and Delaware, and the charter granted William Penn provided for a system of education. This, however, was not carried out until long after Penn's death. The large plantations in the Southern colonies made the establishing of public schools impracticable. Children of the planters were taught in their homes by tutors or governesses. Boys of wealthy families were usually sent to England to complete their education. This system was perpetuated, and but few public schools were organized in the Southern States until after the War of Secession.

During the colonial period private schools, taught by women as a means of support, were to be found in the New England and other colonies. To these the name of *dame schools* or *kitchen schools* was often applied. No women were employed as teachers in the public schools. Occasionally girls were admitted to the dame schools, but no provision for their education was made in the public schools.

Support. Previous to the Revolutionary War the support of the public schools was partly by taxation and partly by rates paid by the parents whose children received instruction, and the plan was continued for a long time after the war. In all colonies the public schools were considered charity institutions, but in Massachusetts this view was not general. This plan of support had a tendency to create class distinctions, and it nearly defeated the purpose for which the schools were organized. Those unable to pay the rates regarded the public provision for educating their children as an evidence of their poverty. The wealthy shunned the schools because they considered them degrading.

The resources of the country were so strained by the Revolutionary War that, for a time, taxation for the support of schools was light, but as the states regained their prosperity public education began to receive better support. The first great impetus given to public education by the national government is found in the Ordinance of 1787 (which see). This consisted in setting aside the sixteenth section of land in every township for the support of public schools. By this provision twenty-eight states were able to accumulate a school fund which, while lightening the burden of taxation, enabled them to develop a highly efficient system of schools. In 1848, when the survey of the Oregon country was ordered, Congress ordered that the sixteenth and thirty-sixth sections in every township be reserved for the support of schools. All states admitted since 1850 have been granted two sections except West Virginia, which was formed from Virginia. Arizona, New Mexico and Utah were granted four sections to the township.

The total area of the grants for common schools is about 81,064,000 acres, which equals the combined areas of the states of Ohio, Indiana and Illinois; the value of this land at the government price of $1.25 per acre would



LAND GRANTS FOR COMMON SCHOOLS

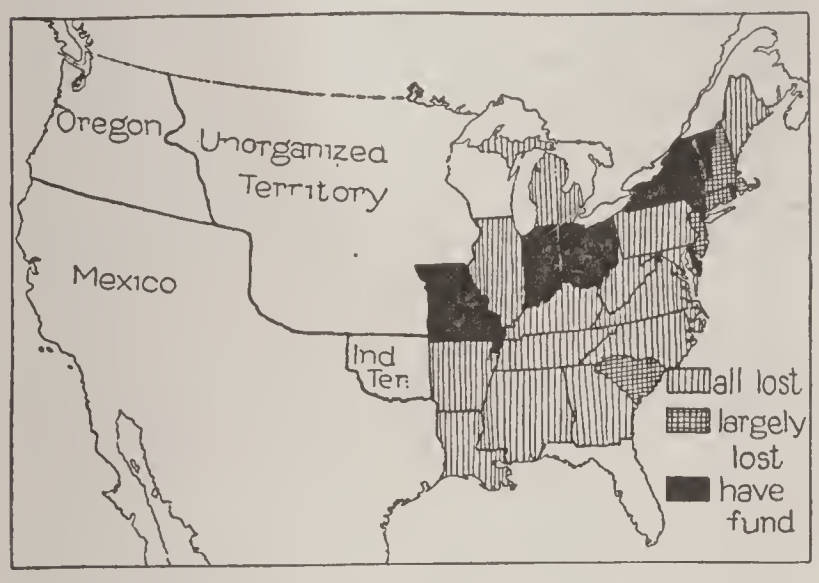
be about $100,000,000. The actual value is, however, much greater, for in those states in which school lands are sold prices ranging from $5 to $25 an acre are received. In states where the lands are leased, the rental is based upon a still higher valuation. To this fund all states admitted to the Union since 1860 have added five per cent of the net receipts from the sale of all public lands within their respective borders.

The original states and Kentucky had no public lands, and these states petitioned Congress for grants from the national domain. The petitions were denied on the ground that such grants would be an obstacle to the settlement of the territory in which they were located. In lieu of grants of public land in Jackson's administration the surplus revenue in the United States treasury, amounting to about $28,000,000, was distributed among the states, each state receiving such a proportion of the entire amount as its population bore to the population of the United States. Some of these states reserved their portion for the support of common schools.

The funds thus provided must necessarily be increased by state and local taxation. The general school fund, that derived from sources described above and from a state tax, is appor-

tioned to the schools according to the laws of the respective states. In some states the distribution is based upon school attendance; in others upon the school population of the school unit, as a county, city or school district.

School Systems. The question "Has the United States a national school system?" is often asked. There is no legally recognized national system of schools. The organization and management of its schools are left to each state, but these forty-eight independent organizations so closely resemble one another in their scope, courses of study and plans of administration that it may be said that the United States has a greater unity and similarity in courses of study and methods of administration than exist in any other country in the world, with the exception perhaps of France. It is, therefore, not incorrect to speak of an American system of education. The chief agencies in securing this unity are the United States Bureau of Education and the National Education Association. The *Reports* and the many other printed documents of the Commissioner of Education have kept the leading school officials and educators informed upon the work



USE OF SURPLUS REVENUE

What became of the $28,000,000 surplus revenue which was distributed among the states for school purposes in 1836-1837.

done in all parts of the country, and at the meetings of the National Education Association methods of instruction and administration and courses of study are discussed and criticized by educators representing every state. The Department of Superintendence has been especially influential in unifying courses of study and methods of administration.

Administration. We have seen that the first schools were established by communities, each community becoming responsible for the support of its own school. This plan was the beginning of the district system of management still found in many states. Settlers move westward along parallels of latitude, and each state organized a school system similar to that of the state or states from which a majority of its inhabitants came. In this way the New England method of administration was extended to all of the states north of the Ohio River. Later, in New England, the town replaced the district as the unit of administration. In all the states west of New England the county is the unit for supervision and for certifying teachers, except in a few localities where the state issues the certificates. In the Southern states the county is the unit of administration. Each state maintains a department of public instruction whose executive officer bears the title of superintendent of public instruction, as in Minnesota, or commissioner of education, as in Massachusetts. In case the department consists of a state board of education, the executive officer may be styled secretary. In some states much of the work of the department of public instruction is largely advisory; in others it is of an executive nature. Incorporated cities are units of administration and their schools are directed by a superintendent or a supervisory principal, who is responsible to the city board of education. The schools of rural districts are in charge of local boards who engage the teacher, provide the necessary school material and have oversight of the school property.

City schools are thoroughly graded and every large city has its own course of study. In all states uniform courses of study for the rural schools have been adopted, and manuals of directions for their use placed in the hands of the teachers. This enables pupils in these schools to make systematic progress through the eight grades of elementary instruction.

Standardization. In all states in which high schools receive state aid, they are required to reach a standard fixed by the state university or the department of public instruction. This plan was so successful in bringing these schools to a higher standard that in several states a similar plan has been adopted for the one-room rural schools. The department of public instruction fixes requirements relating to the grounds, school building, furniture, library, course of study, qualifications and salary of the teacher, and standards of teaching and maintaining discipline. One or more rural school visitors are appointed by the department, who visit those schools of each county which the county superintendent thinks may meet the requirements. In Illinois, if the school has

reached the required standard, a plate marked *Standard School,* with the number of the district, is placed over the door of the schoolhouse. A still higher grade of school in this state is designated as a *Superior School.* In all states where the plan has been adopted it has awakened new interest in education on the part of rural communities.

Consult Betts and Hall's *Better Rural Schools;* Smith's *All the Children of All the People;* Bureau of Education Circular, *Minimum Health Requirements for Rural Schools.*

High Schools. The first high school in the United States was the Boston English School, established in 1821. Since the middle of the nineteenth century high schools have become a part of the school systems of all cities and states. The city high school is a part of the city system and is supported by the regular public school fund. In some states the laws permit the organization of township high schools, making the township the unit for taxation and management. Illinois and Indiana have a large number of township high schools, thus bringing these schools to rural communities. In some states state aid is granted high schools which reach a required standard. In such cases they are usually affiliated with the state university.

For a long time the chief work of the high school consisted in preparing its students for college, but in recent years the work has been broadened and the courses of study have been radically changed to meet modern requirements. While college preparatory courses are still maintained, other courses designed to prepare students for entering upon their chosen vocation have been added. Many high schools now have courses in shorthand, bookkeeping, domestic science and manual training. In many schools courses in elementary agriculture have been introduced, and agricultural high schools are becoming common in the most progressive agricultural states (see AGRICULTURE, subtitle *Agricultural Education*).

Technical high schools are found in large cities. These schools aim to prepare students for various lines of industry, and they are usually equipped with workshops, laboratories and with kitchens for advanced work in domestic science. The consolidation of rural schools has led to the establishing of numerous rural high schools in which the courses of study are adapted to the needs of the students in these communities (see subhead below, *Consolidated Schools*). Some high schools maintain two-year courses for those students who are unable to remain in school to complete the four-year courses. This plan influences many young people to enter the high school who would otherwise leave school on completing the work of the eighth grade.

In many states the supervision of high schools is twofold. These institutions are under the direct supervision of the principal or city superintendent, as the case may be, and under the indirect supervision of the state university, which sends a high-school inspector to visit the schools and report their condition and progress. Graduates of schools which maintain the required standard are placed on the accredited list, and their graduates are admitted without examination to any college or university accepting this standard.

Reports of the Commissioner of Education show that about twenty-five pupils out of every hundred that enrol in the common schools enter high school, and that about fourteen out of every hundred who enter high school complete a four-year term. Only one pupil out of 120 goes to college.

Evening Schools. Evening schools have formed a part of the educational system of the leading countries of Europe for more than a century, but the free public evening school in the United States has been developed since 1850, although several beginnings were made previous to that date. The purpose of these schools is to enable those who are employed during the day to extend their education. Evening schools now form a part of the public school system of every large city, and they are exerting a strong influence in favor of better education of the men and women who are wage earners. The pupils may be roughly divided into three classes—boys and girls who were compelled to leave school before they had completed the elementary course of study, men and women who wish to fit themselves for higher positions, and those who wish to complete some branch of higher education. In general, the pupils are older and more mature than those of the day school. They desire strong, practical work, and the methods employed must necessarily be different from those in the day school. One of the most important lines of work consists in teaching English to foreigners. Evening classes in the technical high schools pursue industrial or commercial subjects. The public evening schools in the United States employ about 15,000 teachers and have an enrolment of about 700,000 pupils.

Besides the public schools, many private institutions maintain evening classes. Some of the most noted of these are the Cooper Union, New York; the Drexel Institute, Philadelphia; the Art Institute, Chicago, and the Young Men's Christian Association classes in all large cities.

Consolidated Schools. The one-room rural school is at a great disadvantage when compared with the graded schools of cities or villages. This disadvantage is so apparent to many families in rural communities that not a few send their children to the nearest graded school. Moreover, one of the chief causes for the movement of the inhabitants of rural communities to the city is a desire to secure better educational advantages for their children. The consolidated school has been established to overcome these disadvantages and to meet the demand of rural communities for better educational facilities. The first consolidated school was established in Concord, Mass., in 1869. At first it included the schools of only two of the old districts, but within ten years every district in the town had been abolished by vote, and the school represented the entire town. Since 1900 the movement for consolidation has grown rapidly, and the consolidated school is now found in nearly every state of the Union.

Consolidation is brought about when adjoining districts vote to unite into one district in accordance with the law providing for such union. The law providing for consolidation also provides for carrying pupils to and from school and for paying for the transportation out of the school fund. In most states the law is permissory, that is, it allows consolidation; in a few it is in a measure compulsory by requiring the closing of all schools whose average attendance falls below a certain number. In Indiana this number is twelve.

The chief advantages of the consolidated school are: Better teachers and more extended courses of study; better school equipment; opportunity for grading the pupils; larger classes; the enthusiasm that comes from numbers; better supervision; more regular attendance; opportunity to teach effectively such subjects as agriculture, domestic science and manual training and so interesting the pupils that they will remain in school a longer time; and, in some instances, an equalization of taxes for school purposes.

Consult Kern's *Among Country Schools,* 1906; Betts and Hall's *Better Rural Schools,* 1914.

Vacation Schools. Vacation schools have been opened in many cities for the purpose of preventing the undesirable effects of the long summer vacation, especially in congested quarters where children have no playgrounds. Some of these schools aim to keep the children off the street and to give them some pleasant and profitable occupation during a part of the day. The girls may be taught sewing or cooking and the boys woodwork or some other occupation. Studies in English may occupy a part of the time. In these schools the playground is an important factor. The other type of school offers regular school work for pupils who have failed of promotion. Both lines of work may be undertaken in the same school. In localities where most of the pupils come from homes of foreigners much attention is given to teaching the children to speak and write English. The length of the term of the vacation school varies from four to eight weeks. One great advantage of these schools lies in the flexibility of the course of study, which enables each school to carry on those lines of work which are best suited to the community that it serves.

Continuation Schools. The increasing demand in the United States for better education on the part of those who are employed during the day has led to the provision of various means through which this demand may in a measure be satisfied. To schools designed for this purpose the name *continuation* has been applied. Continuation schools have existed for centuries in Europe and have reached their highest development in Germany, where attendance upon them is compulsory. Their introduction into the United States is of recent date. Students in continuation schools may pursue lines of work designed to perfect them in some industrial pursuit, or they may pursue studies along the line of general education. While evening schools may be considered as a branch of continuation schools, the most successful work is done where arrangements are made with the employer by which the student is allowed to spend a portion of the day at work and the remainder in school. In some cases the school allows the student credits for this outside work. See subhead *School Credits for Home Work.*

Vocational Schools. Statistics show that eighty-five per cent of the pupils trained in the public schools must earn their living through industrial processes. Vocational schools are schools whose chief purpose is to fit young people for useful occupations. In the broadest

sense they would include all schools devoted to preparation for the professions and for any line of industry, but in its ordinary use the term *vocational* is applied only to those schools engaged in preparing wage earners in industries and in household arts. The term *prevocational* is also applied to these schools. Vocational schools are found in practically every state in the Union. The schools are elementary in character, but do not receive pupils under fourteen years of age. The courses are usually two years in length, but three-year courses are provided in a few of them. In most of the schools the time is about equally divided between book work and practical work. In Cincinnati the public schools are so organized that after pupils have reached the required age they can choose their occupation and divide their time between the school and the establishment where they are employed, and receive credit for this outside work. Many evening schools are largely or wholly vocational, and continuation schools are designed to enable pupils who have left the regular school to go to work to continue their school work or to take up studies directly related to the occupation in which they are engaged.

The practical work for boys usually includes cabinetmaking, carpentry, electrical wiring, forging, founding, pattern making, plumbing, printing and sheet-metal work; for girls the courses include dressmaking, millinery, cookery, housekeeping, art and design and novelty work. The practical work is supplemented by closely related courses in drawing, mathematics and science, and with studies in English, geography, history and civil government. The book work is about the same for boys and girls.

The shop work is usually taught by practical tradesmen, and is made practical and business-like. In some school systems the pupils do repairing, construction work and printing for the board of education; in other schools orders are taken from outside firms, to which the finished articles are delivered at current prices.

Government Aid. One of the most constructive acts of the Sixty-fourth Congress was the Smith-Hughes law relating to industrial education. The bill provides—

1. Appropriation for coöperating with the state in paying the salaries of teachers, supervisors and directors of agricultural subjects. These appropriations begin with the sum of $500,000 for the fiscal year 1918, and increase at the rate of $250,000 each succeeding year until, in 1926, an annual appropriation of $3,000,000 is reached. The sum allotted each state is in the proportion which its rural population bears to the rural population of the United States, with the provision that prior to 1923 no state shall receive less than $5,000 annually, and no less than $10,000 after that date.

2. Appropriations for the purpose of coöperating with states in paying the salaries of teachers of trade, home economic and industrial subjects. These appropriations are for the same amounts as those for the teachers of agricultural subjects, but they are distributed on a different basis, the sum allotted each state being in the proportion that its urban population bears to the urban population of the United States, with the same provision for minimum allotment as in case of the appropriation for agricultural teaching.

3. Appropriations for coöperating with states in preparing teachers, supervisors and directors of agricultural subjects, and of industrial and home economic subjects. This appropriation begins with $500,000 for 1918 and is increased $200,000 each succeeding year until, in 1921, it reaches $1,000,000, which shall be the annual appropriation thereafter. It is divided among the states in proportion to their population.

The act created a Federal Board of Vocational Education to consist of the Secretary of Agriculture, the Secretary of Commerce, the Secretary of Labor, the Commissioner of Education, and three citizens appointed by the President, one to represent manufacturing and commercial interests, one agricultural interests and one labor interests.

AN OPEN-AIR SCHOOL

The canvas screens at the windows protect the children from direct currents of cold air. (From photograph taken in a Chicago, Ill., school.)

Each state is required to create a state board of not less than three members to coöperate with the Federal Board in the administration of the act, and to provide equipment and establish courses of study that meet the approval of the

Federal Board, in order to receive the benefit of the act.

Open-Air Schools. The purpose of the open-air school is to enable children whose physical condition will not allow them to remain in the ordinary school, to continue their education and at the same time recover their health. The first schools of this sort in the United States were opened in New York City and Providence, R. I., in 1904. They are now found in practically all large cities and in many smaller ones. The schools are of two types, those conducted out-of-doors, as on the roofs of buildings, or on the ground with only a tent or roof of some sort for shelter, and those conducted in rooms with open windows, known as open-window schools. Preference is usually given to the outdoor school. Health inspection of school children in a large number of cities shows that from two to ten per cent of the pupils are physically unfit to be in the public schools. This means that from 400,000 to 2,000,000 children of school age should have special attention

THE SITTING-OUT BAG
Shown closed and open. It provides protection to the feet and lower limbs.

given to their physical welfare. The open-air school can restore most of these to health.

The schools endeavor to care, first, for those children who are undernourished and whose general appearance indicates inability to resist disease. Children suffering from any communicable disease, those whose condition requires absolute rest and hospital treatment, and children suffering from forms of tuberculosis, in which the bacilli are given off through the excretions, are excluded. Children should be admitted only after a thorough physical examination.

Special clothing is necessary. This consists of the sitting-out bag, the sleeping bag and a warm outer garment provided with a hood; in place of the hood a knitted woolen cap may be used. In some schools Eskimo suits, like those shown on page 5242, are used. Special footwear is recommended, but this may not be essential. The classes are smaller than in the ordinary school, and the course of study is

SLEEPING BAG AND COT
Used in Chicago's open-air schools.

more flexible, devoting a larger proportion of the time to industrial work. Since rest is one of the principal needs of the pupils, a portion of each session is reserved for quiet. The pupils lie upon couches in their sleeping bags and are encouraged to sleep.

Nourishing food is another important requisite and this is provided by the school. Usually lunch is served in the middle of the forenoon session, dinner at 12:30 and lunch before the pupils go home in the afternoon. All meals consist of plain, wholesome food, so cooked and served as to make every dish appetizing.

Consult Kingsley's *Open-air Crusaders,* 1910; Watt's *Fresh Air for the Average School Children; The Survey,* March 5, 1910; Ayles' *Open-air Schools,* 1911; *Open-air Education,* Bulletin U. S. Board of Education; Upton's *Open-air Schools,* 1914.

Medical Inspection in Schools. Physical examination of over 252,000 school children in New York City public schools showed that seventy-four per cent of them were defective. Over fifty-three per cent of those examined had defective teeth, over ten per cent had defective vision; fourteen per cent defective nasal breathing, and nearly eighteen per cent had enlarged tonsils. None of these children was able to do his best in school because of his physical condition. It would seem that no further argument should be necessary to convince any community or board of education of the necessity of medical inspection of school children.

In the United States medical inspection of school children was begun in Boston in 1894 because of epidemics among the pupils in its

public schools. In 1895 Chicago adopted a similar system, and New York and Philadelphia followed in 1897 and in 1898. Outside these cities the plan received little attention previous to 1907. Since that date medical inspection has been introduced into practically all large cities and many small ones in the United States and Canada. The chief purpose has always been to prevent the spread of contagious diseases, but two other lines of work are carried on. These are the inspection of pupils by teachers to detect defective vision and defective hearing, and a thorough physical examination by a competent physician. This looks to the child's future as well as to his present welfare. It is much less common than the other lines of work.

Medical inspection has made the school nurse a necessity, and in large cities nurses are employed. Their chief duties consist in following up the doctor's recommendations, treating children suffering from colds and other minor troubles so that they may remain in school, watching for children who may need the doctor's attention, and visiting the homes of pupils who are absent because of illness. This last duty often makes the nurse the connecting link between the home and the school.

The support of medical inspection in the United States is inadequate, and the best results have not as yet been secured. In some cities the work is in charge of the board of health and the inspection is by physicians connected with this board. In many of the smaller cities physicians donated their services when the work was introduced, and in nearly all cities the remuneration is so small that experienced physicians cannot be secured. Nurses are paid from $700 to $800 a year, but the pay of physicians is so varied that no average of the compensation can be given.

Consult L. H. Gulick's *Medical Inspection in Schools,* 1908; Russell Sage Foundation, *What American Cities Are Doing for the Health of School Children* and *Medical Inspection Legislation.*

School All the Year Round. The annual reports of the United States Commissioner of Education show that the average number of days in which the public schools of the entire country are in session is a little over 158, or about one-half the number of working days of the year. In some states the average is a little over 198 days; but in others it is less than 100. Moreover, because of irregular attendance, many pupils lose nearly one-half the time in which the school is in session, and the same reports show that the average number of days which children from five to seventeen years of age inclusive spend in school each year is a little over eighty-four. These figures show an educational waste which should be conserved.

All educators agree that in cities the pupils lose during the long summer vacation the habits of industry gained during the school year; that what they learned has not been put into practice, and that too often vicious habits are formed, so that it requires at least a month of the next school year to bring the pupils back to the condition they were in when the school closed. The school authorities of a few cities have tried to remedy these conditions by having school twelve months in the year. The most noted example of this experiment is seen at Gary, Ind. (see GARY SCHOOL SYSTEM). Newark, N. J., and Eveleth, Minn., have also adopted the plan of the all-the-year-round school with marked success, and with satisfaction to both pupils and patrons. The vacation schools in large cities are instituted to overcome the disadvantages of the long summer vacation, but there are only a few of these schools in each city and they are in session only four or six weeks. While these schools are a step in the right direction, they do not solve the problem.

Plan. The school year is divided into four terms of twelve weeks each. One-third of the work of the year may be done in one term, and children are required to attend at least three terms a year. When a child is enroled for the summer term he is expected to attend regularly. The work of the summer term is the same as that of other terms, except that more attention is given to recreation.

Advantages. First, those pupils who have to leave school to go to work as soon as the law will allow gain time in school and can carry their education much further than by the old plan. Between his tenth and the end of his fourteenth year a child may by this plan gain a full school year. This gain is equally valuable whether he goes to work or attends high school. Secondly, the loss occasioned by the long vacation is prevented. Thirdly, many families living in cities which have cold winters desire to escape the severe winter by going to a warmer climate. This they cannot do without taking the children out of school. If they know that the children can take their vacation in winter and do their school work in summer, a serious

obstacle to effecting a change of climate is removed. Fourthly, the school plant is in use throughout the year.

Objections. The great objection raised to school all the year round is that of increased expense, but the experiments that have been tried show that this objection is not valid. The increase in expense is entirely out of proportion to the value of the advantages derived from the plan. The second objection is that pupils and teachers cannot withstand the nervous strain, but the plan allows any pupil to remain out of school one term in the year, and whenever any teacher desires a leave of absence for a term the matter can be easily arranged. The third objection is that the help of the older children is needed at home during the summer. This objection is valid in many rural districts, but the necessity for a summer term in these districts is not so great as in the cities, because in the country the children live an outdoor life and learn much from their contact with nature.

Tendencies. The University of Chicago, since its organization, has been open the year round. Other universities and colleges are following its example in increasing numbers and holding summer terms. In several states the state normal schools are required to hold summer terms. The example set by these institutions has led a few cities to adopt an all-year-round plan. While this new plan may gain ground slowly at first, its advantages are so evident that in time it will probably be adopted by most American cities.

School Credits for Home Work. Many cities are unable to maintain classes in manual training, domestic economy or other lines of vocational training, and industrial conditions are such that the pupils receive little or no practical training in the affairs of life. To overcome this difficulty educators have in some cities and counties arranged a system of credits for work done at home or in other places besides the school. Boys may work in shops, stores or business offices. Pupils may take music lessons, instrumental or vocal, and some schools allow credits for work done in literary societies held outside of the schoolhouses. In some rural communities boys are given credit for various lines of farm work, and girls for canning, cooking, sewing and housekeeping, though both may receive credits for work in which boys and girls can engage, such as gardening and raising poultry. In cities credits are usually given to high school pupils only. In case a pupil desires credit for work in music the lessons must be given by a teacher approved by the superintendent or the principal of the high school, and a stated amount of time must be given to practice daily. In some instances home work is supervised by the teachers; in others the parents certify to it. In all cases a stated amount of work is required. The credits vary under different systems, but they seldom exceed one credit for work done at home to fifteen for school work.

Wherever the plan has been tried it has met with favor, since it enables pupils to acquire practical experience or to take studies not provided in the regular courses without overworking or extending their time in school, and it increases the interest of the home in the work of the school. W.F.R.

Special Schools

Schools for Teachers. Every state system of education and a number of city systems include schools for training teachers. These schools are known as state normal schools, city training schools and schools of education, or teachers' colleges.

Normal Schools. The first public normal school in America was opened at Lexington, Mass., in 1839, and another was opened at Barre, Mass., the same year. From this beginning the normal school idea spread from state to state, until now every state maintains one or more of these schools, and one is maintained by the Federal government in the Philippine Islands. State normal schools are supported by appropriations made by the state legislature. Most of them offer courses of study requiring four years for those students to complete who have not been graduated from a high school, and requiring two years for high school graduates. In the elementary courses the common branches are reviewed from the viewpoint of the teacher. The physical sciences with special reference to nature study, history, civil government, geography and literature are required, and the elements of psychology and pedagogy are taught.

Every thoroughly equipped normal school has a training school including all the grades found in the public schools. Practice teaching in this school is an important part of the course, and the student must show herself to be a suc-

cessful teacher before she can receive the diploma of the school. Some normal schools make arrangements whereby the practice work is done in the city schools and in near-by rural schools. This is the better plan, since it brings the practice teacher in contact with the actual conditions which she must meet after graduation. All practice teaching is done under the supervision of the normal school. In advanced courses more professional work is done, including more advanced work in psychology and pedagogy, child study and the history of education. Courses vary in different states and in different schools in the same state, since each school must adapt its work to the needs of the locality to which it ministers. The chief work of normal schools consists in training teachers for graded and rural schools.

City Training Schools. City training schools are maintained in some large cities for the purpose of training teachers for the schools of the city. They are supported from the city educational fund and are usually under the same management as the public schools. City training schools differ from state normal schools, chiefly in adapting their work to the city course of study. Graduates of the city high schools are usually admitted to the city training school without examination, and a diploma of the training school is equivalent to a certificate of the city superintendent.

Teachers' Institutes. In many states teachers' institutes are held in each county yearly. The time chosen is usually during the summer months when schools are not in session. The average time of the institute is one week. The institute is usually under the management of the county superintendent of schools, and the instructors are educators of extended experience. Methods of teaching the common branches are illustrated and lectures on educational subjects are given. The institute serves as a stimulus to the teachers and gives them many practical suggestions.

Teachers' Colleges, or *Schools of Education,* are schools of pedagogy of collegiate grade. They engage in research work in education, and their courses of study are designed to prepare students to teach in normal schools, to become superintendents of schools, or to take professional positions in other schools of education. Most of these schools are departments of or affiliated with universities. Most of the state universities maintaining schools of education, Harvard University and the University of Chicago, have excellent schools of this kind, and the Teachers' College affiliated with Columbia University has become widely known. Practically all universities maintaining schools of education hold summer terms for the benefit of teachers of elementary and high schools. The work done during these sessions is similar to that of the state normal schools, but those attending have at their disposal all the advantages in the way of equipment and library facilities which a great university can offer.

Government Schools. The public schools of Alaska, the Canal Zone, Guam, Hawaii, the Philippine Islands and Porto Rico are under the administration of the Federal government, being in charge of the Bureau of Education. The chief educational officer, usually styled *director* or *superintendent of education,* is appointed by the President and confirmed by the Senate, but the direction of the educational work is left to the Bureau of Education. From the academic viewpoint the chief work of these schools is to teach the natives to speak and write the English language. In addition, the same branches are taught that are found in the elementary schools in the United States, but a larger proportion of the time is allotted to industrial work. However, the work of the teachers and supervisors does not stop here. They are expected to do whatever they can to elevate the standard of living, secure the introduction of sanitary measures and to protect the natives from unscrupulous traders who try to purchase whatever they have to sell much below the market price.

A good illustration is seen in the work of the Bureau of Education in Alaska. Every teacher is a social worker, and, in addition to performing the routine work of the school, strives in every way possible to promote the physical, moral and industrial welfare of the natives, adults as well as children. Under direction of the teachers and nurses the natives are encouraged to build sanitary homes. In some places they are taught to raise vegetables. A number of coöperative stores have been established through the encouragement of the Bureau of Education, and these are under the supervision of teachers. The reindeer service, introduced into the territory by the Bureau in 1892, is still under its supervision and is proving to be one of the most beneficial measures thus far undertaken for the benefit of the Eskimos. All medical work, including the furnishing of supplies, is also in charge of the Bureau.

In all outlying possessions the government schools have exerted a strong influence over the

native people in elevating their standard of living, strengthening their moral character and preparing them for citizenship.

Government schools for Indians are in charge of the Commissioner of Indian Affairs (see INDIANS, AMERICAN, subhead *Education*). The schools of Washington, D. C., are controlled by a local board of education. One-half the expense of their maintenance is appropriated by Congress and one-half is provided by the city.

Parochial Schools. Parochial schools are established and maintained by religious denominations. Broadly the term would include church educational institutions of all grades, but as it is ordinarily used it applies to elementary schools only. Nearly all denominations maintain parochial schools for one cause or another. In all, the doctrines of the Church by which the school is maintained are taught. The course of study and methods of instruction conform to those of the public schools of the city or state in which the school is located. In some of these schools girls are taught sewing and cooking, and boys are given work in manual training. The Roman Catholic, Episcopal and Lutheran churches maintain high schools in some localities, and practically all denominations have mission schools for the education of Indian and negro youth. Parochial schools are supported by their respective churches or societies and by the income from endowment funds and tuition.

Technical Schools. Technical schools were originally schools of engineering. The first school of this sort in America was the Rensselaer Polytechnic Institute at Troy, N. Y., founded in 1824. About twenty years later the universities began to give attention to technical education, and the Sheffield Scientific School at Yale and the Lawrence Scientific School at Harvard were founded in 1847. The latter extended its scope to include courses in engineering, mining, architecture, chemistry, biology, geology and other sciences. In 1862 Congress passed the Morrill Act, which made large grants of public land to the state for establishing agricultural experiment stations. This act gave a great impetus to technical education, and now every state has its agricultural experiment station. All technical schools fit men for professions.

There are other technical schools of high order not connected with universities but doing a work of equal grade. Among these are the Rose Polytechnic Institute, Terre Haute, Ind.; the Pratt Institute, Brooklyn, N. Y.; the Case School of Applied Science, Cleveland, Ohio, and the Lewis Institute and Armour Institute of Technology, Chicago. The Massachusetts Institute of Technology, a technical school of the highest grade, has become affiliated with Harvard University. Each of these institutions is described under its title.

Technical high schools fit students for trades. There are also trade schools of a technical character, such as the textile schools in Lowell, Lawrence and Fall River, Mass.

Trade Schools. Trade schools are engaged in preparing their pupils for some trade, such as carpentry, bricklaying, printing, etc. They were established to take the place of the apprentice shop system which the introduction of modern machines has made impracticable. Most of these schools require applicants for admission to be at least sixteen years of age and to have a common school education; consequently they can do more advanced work than the elementary vocational schools.

The length of the courses varies from five or six months to four years. In the short courses most of the time is devoted to practical work. In the longer courses industrial drawing, mathematics, the physical sciences and other related supplementary subjects, together with English, American history and civil government, are required. There is a close resemblance between the trade schools with long courses and the technical high schools. W.F.R.

Moonlight Schools. Moonlight schools are schools in which adult illiterates may learn to read and write. Their advantages are also offered to literate adults who may desire to improve their education.

These schools had their origin in Rowan County, Kentucky, in September, 1911. Mrs. Cora Wilson Stewart, then superintendent of the Rowan County schools, and later chairman of the Kentucky Illiteracy Commission, is their founder. She opened the schools of the county on moonlight nights, pledged the teachers to teach all illiterates who would come, and invited the people to attend, free of charge. To the surprise of all, 1,200 persons crowded into the schools. Within three years' time, the 1,152 illiterates in Rowan County were reduced to twenty-three, only six of whom had the capacity for learning.

Twenty-five other counties in Kentucky established moonlight schools. Then the Kentucky legislature created an Illiteracy Commission, the first of its kind in the world. Five educators were appointed by the governor, with

Mrs. Stewart the head of the commission. A state-wide war against illiteracy, through moonlight schools, has been launched, and the commission organized the state for it with the slogan, "No illiteracy in Kentucky in 1920."

In 1917 twenty-two states had moonlight schools, and eleven of these were working under illiteracy commissions, all of which is a direct outgrowth of the Kentucky plan. The moonlight school ministers to illiterate fishermen on the coast of Maryland, to illiterate immigrants on the coast of California, to illiterate Swedes in Minnesota, to Indians in Oklahoma, to mountaineers in the Appalachians and to both whites and negroes in all of the Southern states. Kentucky reduced its illiteracy one-half during the three years following the creation of its commission. North Carolina taught 10,000 during 1915, and continues with energy to stamp out its illiteracy. Alabama is contesting with Kentucky for first place of honor in 1920.

The moonlight schools are conducted entirely by volunteer teachers. The readiness with which teachers have responded is remarkable, but is no less remarkable than the ease and rapidity with which illiterates have learned. Many have learned to read simple books and papers in two or three weeks, and some have learned to write their own letters in even a shorter length of time, showing that adult illiteracy is easy to overcome. The ages of some who have learned in the moonlight schools show that neither the ambition nor the power to learn is confined to the young. One man aged ninety-four and one aged ninety-eight learned to read and to write their own letters. Most significant are these facts for the hope and encouragement which they give.

The name *moonlight school* signifies that it is a school conducted only on moonlight nights. In the beginning this was true, the moonlight being used to light the people over the roads. Their clamor for a continuous session caused the plan to be changed, and the opening week only is now regulated by moonlight nights.

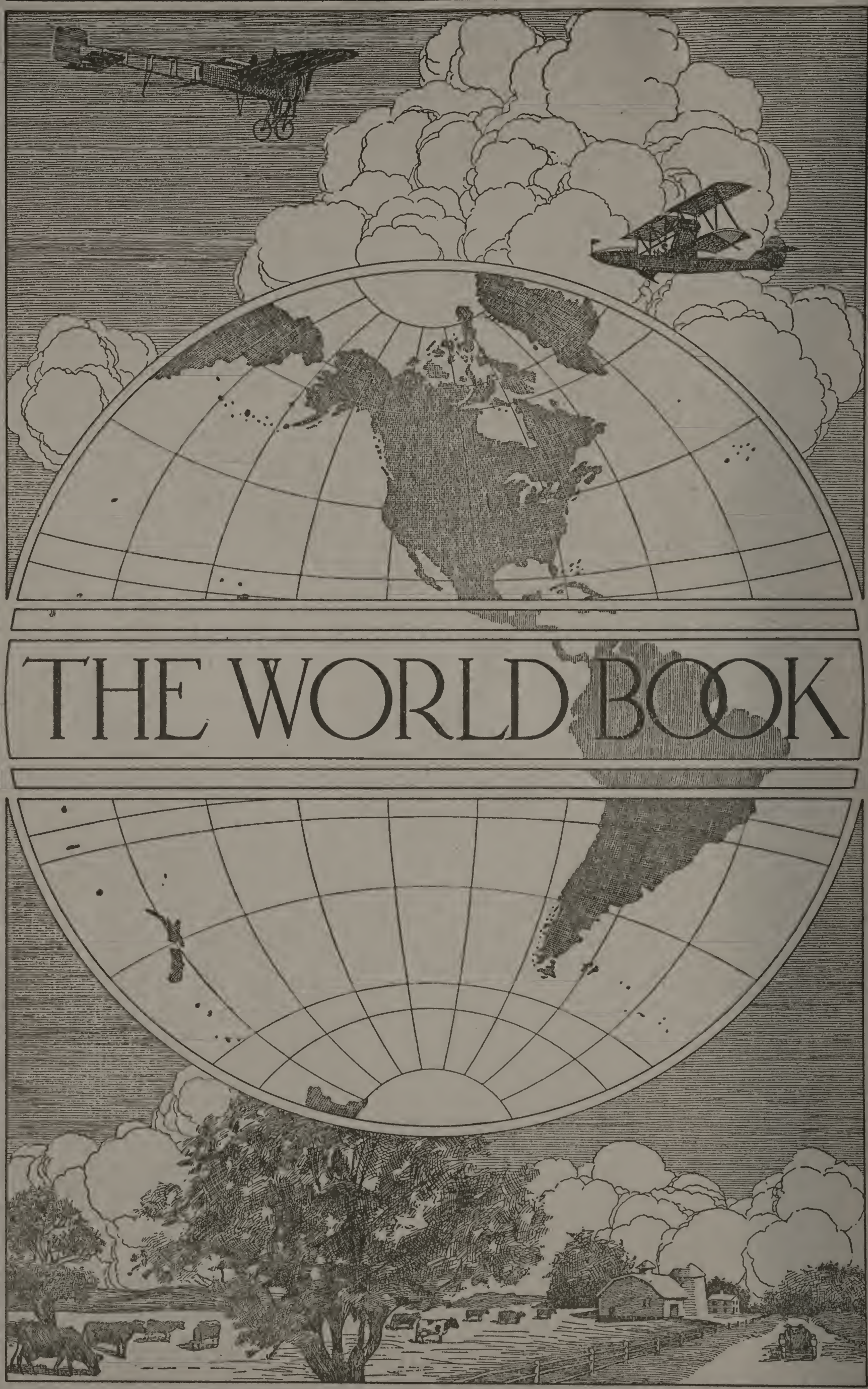
Unique and attractive equipment has been prepared for these schools. Readers that deal with the road, the farm, the bank, the newspaper, and with other matters of interest to adults, and copy books with colored sheets and grooved letters make up part of this equipment. The plan is that illiterates shall not only be instructed, but also that they shall have books and supplies free of all cost. C.W.S.

Correspondence Schools, institutions organized to provide instruction in various branches of learning by means of lessons sent by mail. These schools aim to reach and benefit at least three classes of people. A person of middle age may deplore his lack of early training and seek to remedy the defect; even if his financial condition makes it possible for him to go to school, he hesitates to enter ordinary school classes on an equality with boys and girls. A teacher may wish to study under competent direction while engaged in his profession, and thus prepare for a better position or work towards a college degree. A mechanic, clerk or machinist may wish to perfect himself in his chosen vocation by evening study. To such, and to others with needs less specific, correspondence schools have made a strong appeal since President William R. Harper, of the University of Chicago, about the year 1895, declared he could teach Sanskrit by mail as successfully as in the classroom. He exerted a profound influence upon this means of education.

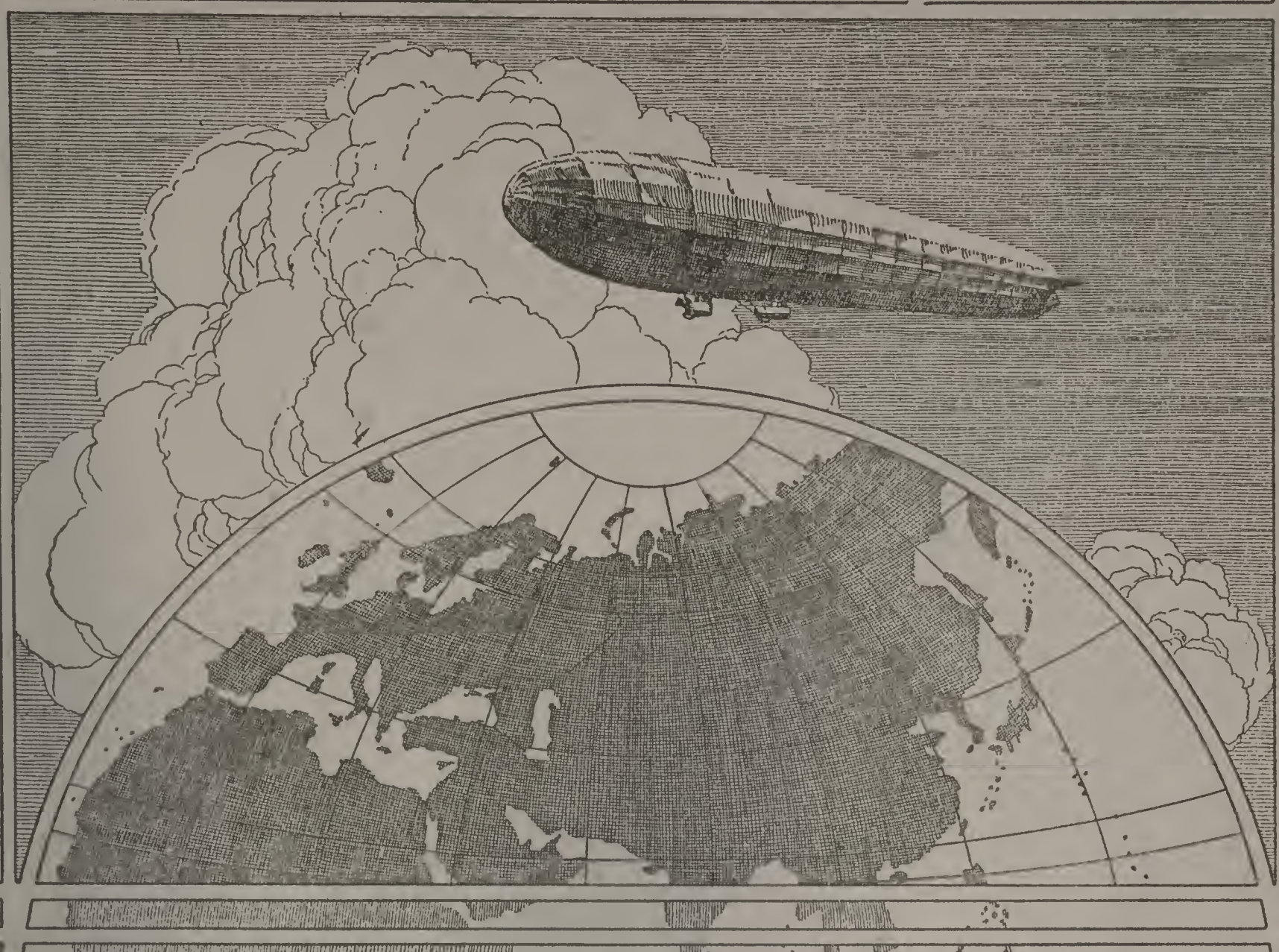
Dr. Harper's courses by correspondence were not the first to be offered, but he doubtless gave to the world the earliest practical ideas on the subject. The University Extension movement in England adopted such means of instruction in 1868, and America put the same plan into operation on a small scale in 1873. Since then nearly a hundred correspondence schools of every conceivable type have made their bids for public patronage. Some were organized sincerely to promote education; of this class are the correspondence study departments of the universities of Chicago and Wisconsin, of several state universities and a very few privately-owned institutions; others have been conducted by people without educational equipment whose main object has been financial gain. The schools of the latter class have injured the cause of correspondence instruction by breaking down the confidence of the public; it has been impossible for the prospective student always to determine the educational soundness of the school which sought his patronage, and often he has failed to receive adequate return from his investment. E.D.F.

Related Subjects. The reader who is interested in the subject of schools is referred to the article on EDUCATION, page 1929. It has numerous subheads, while at the close of the article, on pages 1954 and 1955, there appears a long list of topics which may also be consulted in this connection.

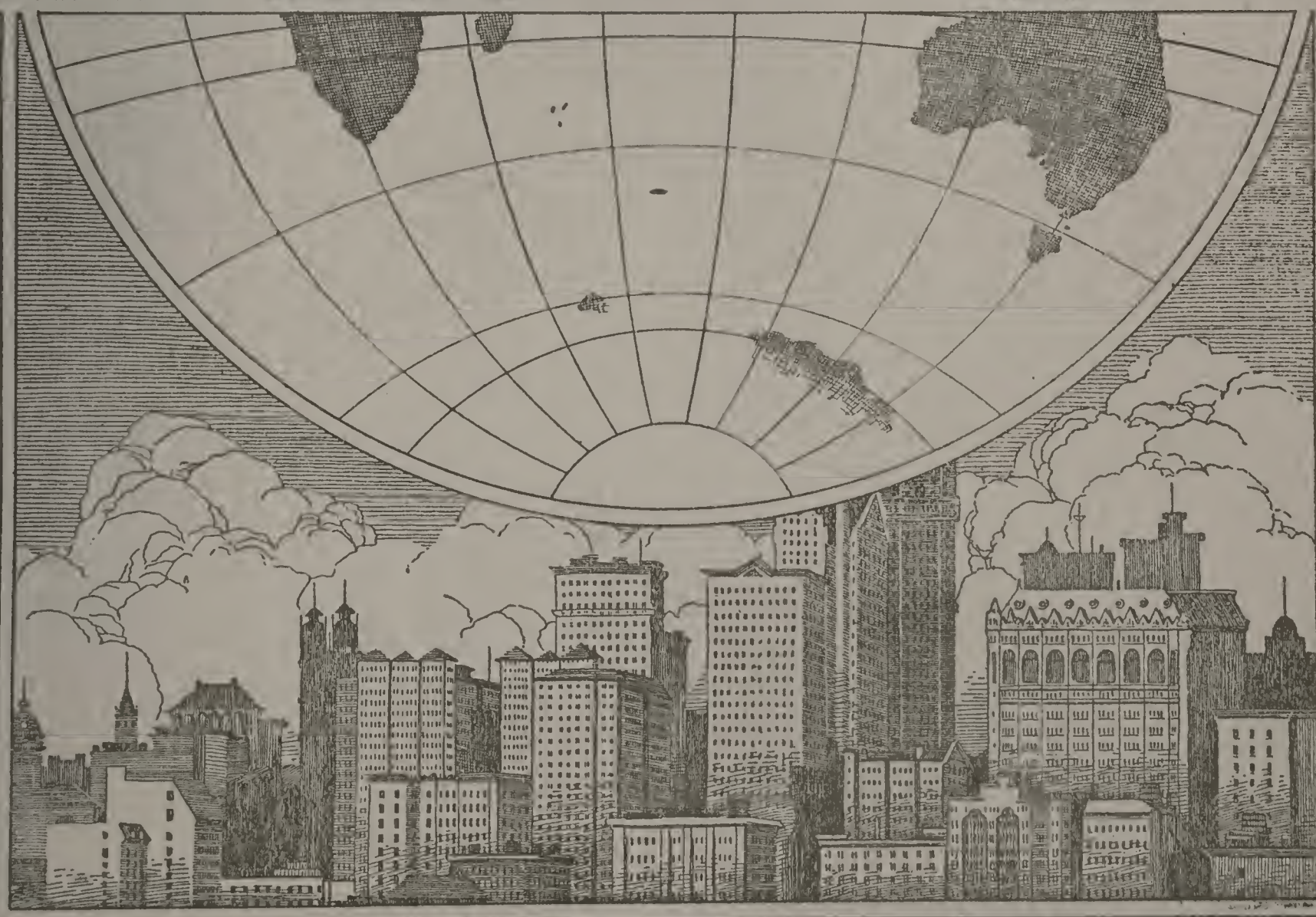
End of Volume Eight



THE WORLD BOOK



THE WORLD BOOK



LIBRARY OF CONGRESS
0 038 278 321 9